E83-10268 HS 236-0019-1679

NASA-CR-170534

"Made available under NASA sponsorship in the interest of early and wide dissemination of Earth Resources Survey Program information and without liability for any use made thereof."

SEPT 1982

THEMATIC MAPPER

(E83-10268) THEMATIC MAPPER FLIGHT MODEL PRESHIPMENT REVIEW DATA PACKAGE. VOLUME 4: APPENDIX. PART D: FOCAL PLANE ASSEMBLY DATA (Santa Barbara Research Center) 440 p HC A19/MF A01 CSCL 14B G3/43

N83-26137

Unclas 00268

Prepared for

GODDARD SPACE FLIGHT CENTER

Greenbelt, Maryland 20771

CONTRACT NAS 5-24200

FLIGHT MODEL

PRESHIPMENT REVIEW

DATA PACKAGE

VOLUME IV - APPENDIX

PART D - FOCAL PLANE ASSEMBLY DATA

Article IV - 3A

HUGHES

HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATIONS GROUP

ORIGINAL PAGE IS
OF POOR QUALITY

HS 236-0019-1679

THEMATIC MAPPER

Prepared for
GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland 20771
CONTRACT NAS 5-24200

SEPT 1982

FLIGHT MODEL
PRESHIPMENT REVIEW
DATA PACKAGE
VOLUME IV - APPENDIX
~~PART F - RADIATIVE COOLER~~
PART D FOCAL PLANE ASSEMBLY DATA
Article IV - 3A

HUGHES
HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP

Hughes Ref No. 34596

Appendix D

Focal Plane Assembly

Test Data Record Summary

This appendix contains a summary of the test data taken on each Band Level Assembly for the Cold and Prime Focal Plane Assemblies.

Band 1	S/N 401
Band 2	S/N 401
Band 3	S/N 401
Band 4	S/N 401
Band 5	S/N 201
Band 6	S/N 101
Band 7	S/N 201

ORIGINAL PAGE IS
OF POOR QUALITY

TM PFPA

FLIGHT BAND #1

S/N 401

11/19/81

ORIGINAL PAGE IS OF POOR QUALITY

INTRODUCTION

The following pages summarize the data obtained for the Band 1 TM Flight Full Band Assembly (P/N 50797) as of November 19, 1981.

The enclosed data has been collected from half-band, post amplifier, and full-band acceptance test data records. It is presented here to make it available in a single package.

Neville C. Davison III

Neville C. Davison, III
FPA Test Supervisor

D.M. Randall

D.M. Randall
F.P.A. R.E.A.

ORIGINAL PAGE IS
OF POOR QUALITY

INDEX

ORIGINAL PAGE IS OF POOR QUALITY

REVISIONS

		DESCRIPTION	DATE	APPROVED	
	A	INITIALLY RELEASED 8-22-79			
51[illegible]5 S/N 00_ & UP	B	REPLACES REV A WITH CHANGE AS REQUESTED BY ECR TM1202/01 TO UPDATE TEST PROCEDURE	1-7-80	HJS	[illegible]
51065 S/N 001 & UP	C	Incorporated TM1357/01.(1-6) See Revision Notice.	80-2-13	mm	[illegible]
[illegible]	D	INCORPORATED TM1438/01 R1 AND TM1420/01. SEE REVISION NOTICE.	80-4-21	[illegible]	[illegible]
51065 S/N 002 & SUBQ	E	Incorporated E.O. 9965 and E. O. 1684A.	80-11-19	BM	[illegible]
51065 S/N 003 & SUBQ	F	Incorporated E.O. 2068A.	80-11-19	BM	[illegible]
51065 SN 002 & SUBQ	G	INCORPORATED TM2220/01.(1) ADDED TO PARA 4.9. INCORPORATED EO'S 2972A & 2978A.	81-3-31	mm	NCD
51065 S/N 003 & SUBQ	H	Incorporated E.O. 2769A	81-5-14	NCD	NCD
51065 S/N 0[illegible] & SUBQ	J	Incorporated E.O 3843A AND E.O. 3830A; ECR's TM2512/01 and TM2517/01	81-10-23	NCD	NCD

MAIN AMP P/N 50797
OP. #2600
MAIN AMP P/N 50504-1
OP # 1300

PARA. 4.8 CROSSTALK
ALL EVEN CHANNELS
OUT OF SPEC.

C. R. Lane
11-03-81

11-3-81

FLIGHT BAND 1

REVISION STATUS THIS PRINT NOT MAINTAINED AFTER
NOV - 5 1981
DO NOT USE THIS PRINT
UNLESS YOUR ORDER OR INSTRUCTIONS SPECIFY THE REVISION LEVEL SHOWN

CONTRACT NO.
NAS 5-24200

[illegible]	1-2-80
[illegible]	1-2-80
[illegible]	1-3-80
APPROVED	

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company
GOLETA, CALIFORNIA

TITLE
TEST PROCEDURE, TM BANDS 1-4
SIGNAL CHANNEL ELECTRONICS

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

SCALE | SHEET 1 OF 21

ORIGINAL PAGE IS
OF POOR QUALITY

1.0 SCOPE

This document describes the functional test of the Silicon Detector and Preamplifier Assembly, 50797, and the Postamplifier Circuit Board for Bands 1-4, 50904. Together these make up 16 complete channels, or one spectral band, of TM signal electronics. In preparation for the test, the 50797 assembly is mounted in the 75729 bonding and test fixture. A modulated LED is focussed on each individual detector. The postamp boost and rolloff resistors are set for each channel to provide proper frequency response from 100 Hz to 52 kHz and transient response to a 10 μs ramp. Wideband noise is measured for each channel. Crosstalk is measured from each channel to all other channels at 50 kHz. Once a preamp and postamp assembly are tested together, it is intended that they be installed in the same band location in the TM instrument.

2.0 APPLICABLE DOCUMENTS

2.1 SBRC Documents

The following documents specify the electrical assembly design and are for use in identifying details necessary in testing.

Drawings

50797	Silicon Detector & Preamplifier Assembly
50805	Electronic Diagram, Silicon Detectors & Preamplifiers
50904	PWB Assembly, Postamplifier, Band 1-4
52732	Parts, Electronics Select, TM
50905	Elec. Diagram, Postamplifier, Band 1-4
75918	Detector Array Alignment Fixture Assembly
76600	Full Band Test Set
76601	Voltage to Current Converter
76602	Optical Fiber
78273	FPA Temperature Controller Assy.
200085	Test Box, TM FPA Break Out

3.0 TEST EQUIPMENT REQUIRED (OR EQUIVALENT)

3.1 Full Band Test Set, SBRC Drawing 76600

The test set contains connectors to mate with the Detector and Preamplifier Assembly, a connector to accept the post-amplifier circuit board, a selector switch to monitor preamp and postamp outputs and potentiometers for adjusting the boost and rolloff resistance.

3.2 Oscilloscope

Tektronix type 547 oscilloscope with a 1 A7A plug-in, or equivalent.

3.4 Wave Analyzer

Hewlett Packard 3591A selective voltmeter, or equivalent, is used to measure crosstalk.

3.5 True RMS Voltmeter

Hewlett Packard 3400A, or equivalent, to measure frequency response and wideband noise.

3.6 Detector Array Alignment Fixture Assembly, SBRC Dwg. 75918

This assembly contains a microscope with a photometric eye-piece which allows the light from an optical fiber to be focussed onto an individual detector element.

3.7 Optical Fiber, SBRC Dwg. 76602

An optical fiber about 2 feet long is used between the light emitting diode (LED) and the alignment fixture assembly so the LED drive signal current will not be picked up by the high impedance focal plane circuitry.

3.8 Light Emitting Diode

Laser Diode Laboratories, type 639AS3831.

3.9 Voltage-to-Current Converter, SBRC Dwg. 76601

This box drives the LED with a current proportional to its voltage input.

ORIGINAL PAGE IS
OF POOR QUALITY

3.10 <u>Function Generator</u>

Wavetek type 147 drives the voltage-to-current converter for the frequency response and crosstalk tests.

3.11 <u>Pulse Generator</u>

Data pulse type 116 drives the voltage to current converter for the transient response test.

3.12 <u>Integrator/Averager</u>

PAR type 162 is used to improve the signal to noise ratio during the transient response test. The model 164 gated integrator plug-in is used.

3.13 <u>Plotter</u>

Hewlett Packard type 7044A is used with the Integrator/Averager.

3.14 <u>Automatic Equipment</u>

The following equipment is used when testing is performed in other than the manual mode.

3.14.1 <u>Network Analyzer</u> - The HP 3042 Network Analyzer consists of a 3330B Synthesizer, 3570A Network Analyzer and a 9825S Desk Top Computer.

4.0 PROCEDURE

4.1 <u>Inspection</u>

Check to see that nominal component values have been installed on the postamp board at C33-48, R1-16, R17-32, R33-48, R65-80 and R81-96. The nominal values are shown on the postamp assembly drawing 50904 as a function of the intended band number (1-4). The assembly drawing also gives a 52732 Select List Dash Number for each select component also as a function of intended spectral band. The final selected value must be chosen from the values in the list.

4.2 <u>Setup</u>

Attach the 50797 Detector Preamplifier Assembly (mounted in the bonding and test fixture) to the baseplate of the Detector Array Alignment fixture. Focus the microscope on detector element number 1 of 16. Connect the sinewave generator, voltage-to-current converter, LED and optical fiber. Locate the LED as far as possible from the detector-preamp assembly. Insert the postamp board into the test set socket.

4.3 Supply Current

Apply $\pm 21V \pm 0.5V$ to the test set following the indicated polarity. Limit the currents to 200 mA. Turn on the supply and record the currents as indicated on the supply meters.

4.4 Offset Adjustment

Connect the test set postamplifier high and low outputs to the + and - inputs of the oscilloscope preamplifier. Adjust the nominal 20 KΩ offset resistor in each channel to produce a differential offset voltage, $V_{OH} - V_{OL}$, of $0 \pm 1V$. Record the offset voltage and resistor value. The focal plane assembly must be dark for this test, and the temperature of the array must be $15 \pm 2\ ^{o}C$. If necessary, both the offset resistor and offset trim resistor may be selected to obtain the required output voltage. The tolerance for each band shall be as follows: $(\pm 1.0 \text{ volt})(G'/G_o)$ where G_o is the nominal band gain, and G' is the gain in each channel calculated from the following formula:

$$G' = G_1 \cdot G_2 \cdot G_3$$

$$\text{and } G_1 = \frac{10(R_{pre}/2 + 5.5)}{(R_{pre})(5.5)} + 1$$

and $G_2 = 1/3$, if the Post Gain resistor is NOT installed,

$$\text{but } G_2 = \frac{\dfrac{(5)(R_{post})}{(10 + R_{post}/2)}}{20 + \dfrac{(5)(R_{post})}{(10 + R_{post}/2)}}$$

, if the post gain resistor IS installed.

Post Gain resistors for Bands 2, 3 and 4 may be lifted to facilitate frequency response and transient response testing. The following values of G_o are to be used only for the purpose of this test:

$G_o = 8.9$ (Band 1) $\quad G_o = 3.4$ (Band 3)
$G_o = 2.8$ (Band 2) $\quad G_o = 1.45$ (Band 4)

The presence or absence of post gain resistors during frequency response and transient response testing shall be recorded.

ORIGINAL PAGE IS
OF POOR QUALITY

4.5 Low Frequency Gain [illegible]

Connect the true-reading rms voltmeter to the oscilloscope preamplifier output. Adjust the sinewave generator to produce a 4 v ± 1 v pk-pk [illegible] Hz undistorted sinewave on the scope. In each band select the channel whose feedback resistor is closest to the nominal value ([illegible] x 10[illegible] ohms). Adjust the post-gain resistors on the postamp board so that the gain value for each of the other channels matches that of the selected channel ± 5%. Resistors are to be replaced at the conclusion of this test. Record the final resistor values.

NOTE: When testing Band 4 only, postamp board resistors R[illegible] through R48 (post-gain resistors) must be lifted from the circuit board at one end. Otherwise a 4V pk-pk signal will not be attainable. Resistors are to remain lifted throughout the remainder of this test.

4.6 Frequency and Transient Response Adjustment

Measure the response to a 10 μs ramp using the pulse generator, voltage-to-current converter, light emitting diode, optical fiber and microscope. Adjust the boost control on the test box for flattest response in the 30 to 500 μs region after the ramp. Now reconnect the function generator and set the rolloff control on the test box for -3.0 db at 52 kHz. These controls are interactive so several iterations may be required.

The final setting should result in the transient response reaching final value within 1% after 60μS and within 1.5% after 35μS. Record the maximum overshoot (limit = 10%) and the 2 to 98% risetime (limit = 20μS). The frequency response should be -(3 +0/0-0.5) dB at 52 kHz. Record the boosted frequency response on the data sheet for the boost and rolloff settings obtained. Plot the transient response using the Integrator/Averager and the plotter.

It may be necessary to add capacitance at C33-C48 to meet the requirement. If capacitance is added, record the values on the data sheet. If no capacitor is required, enter 0 for value and make note that capacitor was not needed.

4.7 Wide band noise, referred to the preamplifier output, shall be defined as:

$N' = (V_{meter})/(\text{channel gain})(\text{scope gain})$; in volts rms.

Wideband noise referred to the front end of the video amplifier shall be defined as:

W.B. Noise = N'/R_{fb} ; in amperes.

Where V_{meter} is the output of the wideband, true-reading rms meter.

4.7 (Continued)

And R_{fb} is the feedback resistor value for each channel in ohms.

With the boost and rolloff resistors set as described in paragraph 4.6, record the meter reading (in volts) for each channel, channel gain as appropriate, scope gain, and the feedback resistor value. Using these values calculate N' (to three significant figures), and N.E. Noise (to two significant figures). Record the calculated values in the test data record.

4.8 Crosstalk - Using the wave analyzer at the 117A signal output and the sinewave light source driver with the voltage-to-current converter, measure the crosstalk from each channel to its four nearest neighbors at 50 kHz. (Channel 1 has only 2 nearest neighbors: 2 and 3. Channel 2 has 3: 1, 3 and 4. Channel 3 has 4: 1, 2, 4, and 5. Also record the average crosstalk from each channel to its 11 non-neighbors. The measured crosstalk shall be less than 1% (-40 dB) for nearest neighbors and less than 0.1% (-60 dB) for non-neighbors.

4.9 Ground Continuity and Isolation

Turn off power. Remove connectors. Measure <11 ohms between J1-1 and:

J1-27	J2-6
J1-23	J2-10
J1-1	J2-31
J1-5	J2-27

Record maximum reading of Data Sheet.

Measure >1 MΩ between J1-16 and

J1-18	J2-15
J1-11	J2-21

Check Data Sheet O.K.

Measure >1 MΩ between J1-16 and the FPA aluminum mounting fixture.

Check Data Sheet O.K.

Measure [illegible]25Ω between J1-16 of odd channels and J1-16 of even channels for Bands 1, 2, 3 and 4. Check data sheet O.K.

4.10 Time Delay

Measure the Time Dealy between the 50% points of the led drive current waveform transition and the corresponding channel output waveform transition. Display both waveforms on the oscilloscope, using a dual trace plug-in with external sync and 2uS/CM sweep time. Photograph the rise and fall separetely for each channel. Record the delays on the Data Sheet. They shall be TBD ±0.5uS.

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

5.0 QUALITY ASSURANCE PROVISIONS

5.1 Notification of QA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by QA Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All Flight Assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

5.4 Failures

Problems/failures encountered during testing of flight hardware shall be handled in accordance with Thematic Mapper Product Effectiveness Plan HS236-0066A.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer, QA Engineer, and Design Engineer. When the QA Engineer has not witnessed the test, he should sign the data sheet after it is reviewed by the Design Engineer. A typical data sheet format is included at the end of this procedure.

6.2 Distribution of Test Data

After the test data sheet is signed, place one (1) copy in the traveling file, one (1) copy and the original in the Engineering file, and give one (1) copy to QA.

ORIGINAL PAGE IS
OF POOR QUALITY

TEST DATA RECORD

Detector Preamplifier Assembly 50797, S/N 401
contains 51015 assemblies S/N 209 and 102-1,
odd and even channels, respectively.

Postamplifier Circuit Board Assembly 50904, S/N 201
Intended for TM Spectral Band ONE.
Feedback Resistor values from data sheets for specification 16306.

	ODD		Even
1	.89	2	.98
3	.93	4	1.07
5	1.10	6	1.05
7	.96	8	1.04
9	1.05	10	.92
11	1.00	12	.91
13	1.05	14	.97
15	.87	16	.98

4.3 Power Supply Current
Limit: 200mA
- 21V 133mA
- 21V 160mA

Test Engineer [signature] Date 10-28-81

Test Supervisor [signature] Date 10-28-81

Quality Control Stamp I 118 VERIFY DATA COMPLETE Date 11-12-81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV	SHEET

4.4

ORIGINAL PAGE IS
OF POOR QUALITY

Channel	Resistor	Value	908600-( )	Measured Offset Voltage	
1	R17	19.1K	-249	+.400 VDC	
2	R25	22.1K	-255	-.500	
3	R18	21.0K	-253	+.550	
** 4	R26	20.5k	-252	-.075	**
5	R19	21.5k	-254	-.350	
6	R27	21.5k	-254	+.300	
7	R20	18.2k	-247	-.090	
8	R28	21.0k	-253	-.020	
9	R21	18.2k	-247	+.250	
10	R29	18.7k	-248	-.400	
11	R22	19.6k	-250	+.400	
12	R30	19.6k	-250	-.300	
13	R23	22.1k	-255	-.400	
14	R31	20.5k	-252	+.650	
15	R24	21.0k	-251	-.500	
16	R32	19.6k	-250	+.500	

Test With Resistor [X] IN [ ] OMITTED

If IN record the nominal value of the Test Gain Resistor: 27.6 K

Test Engineer C. R. Lord Date 10-28-81

Test Supervisor [signature] Date 10-28-81

VERIFY DATA COMPLETE

Quality Control Stamp 118 Date 11/12/81

* BIAS TRIM RESISTOR = 549Ω

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV C	SHEET 11

4.5 [illegible] Resistors

ORIGINAL PAGE IS
OF POOR QUALITY

LIMITS:

[illegible]

Channel	Position Value	[illegible]
1	R61 5.76K	-199
2	R[illegible] 6.98 K	-207
3	R[illegible] 7.50 K	-210
4	[illegible] 6.81 K	-206
5	R[illegible] 11.0 K	-226
6	R91 9.53 K	-220
7	R[illegible] 7.15 K	-208
[illegible]	R[illegible] 6.98 K	-207
[illegible]	R[illegible] 10.5 K	-224
[illegible]	R[illegible] 7.50 K	-210
[illegible]	[illegible] 7.87 K	-212
12	R[illegible] 5.76 K	-199
13	R[illegible] 10.5 K	-224
14	R[illegible] 6.04 K	-201
15	R88 6.34 K	-203
[illegible]	R[illegible] 5.76 K	-199

Test Engineer C. L. Lang Date 10-28-81

Test Supervisor [illegible] Date 11-28-81

Quality Control Stamp 118 VERIFY DATA COMPLETE Date 11/12/81

SIZE	CODE IDENT NO	NUMBER
A	11323	[illegible]

SCALE	REV [illegible]	SHEET 12

FORM NO [illegible] DIETERICH POST CLEARPRINT 1000H

4.6 Transient Response

Maximum excursion from final value after time $t_0 + t$ where t_0 is the time when the response reaches 2% of final value.

ORIGINAL PAGE IS
OF POOR QUALITY

	t = 30μS Limit = 1.5%	t = 60μS Limit = 1.0%
Ch 1	1.5 %	1.3 %
* 2	1.8 % *	1.0 %
3	1.0	0.5
4	2.0	0.8
5	4.0	1.0
6	1.4	.7
7	2.6	.9
8	0.9	.3
9	2.0	.1
10	2.0	.5
11	1.3	1.2
12	1.0	.7
13	1.7	.1
14	1.3	1.0
15	2.2	1.3
16	1.2	1.0

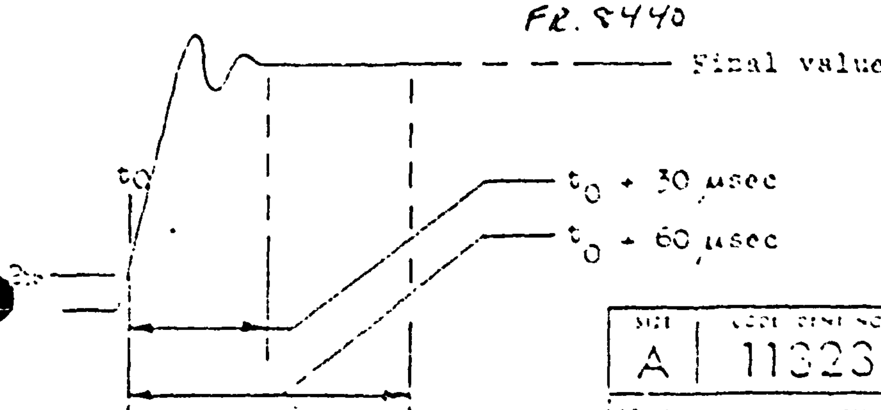
*MEASUREMENTS MADE AFTER CH. 2 BOOST & ROLLOFF RESISTORS WERE RESELECTED & GND PLANE WAS FIXED.

Test Engineer ____________ Date 11-11-81

Test Supervisor ____________ III Date 11-11-81

Quality Control Stamp S CH 2 OUT OF SPEC Date 11/12/81

FR. 8440



NOTE: DATA FOR CHANNELS 1 & 3-16 COPIED FROM TEST DATA RECORD OF 11-5-81 N.C.D. III
Nov. 19, 1981

SIZE	CODE IDENT NO	DRAWING NO
A	11323	16597
SCALE	REV C	SHEET 13

OVERSHOOT	Ch.	%	RISETIME	Ch.	µSec
	1	3.0 %		1	13 µSec
	* 2	0.2 %		2	17 µS
	3	4.0		3	14
	4	4.0		4	15
	5	0.2		5	14
	6	2.2		6	16
	7	-1.5		7	15
	8	3.5		8	16
	9	2.5		9	13
	10	2.0		10	16
	11	3.0		11	14
	12	3.0		12	15
	13	3.5		13	14
	14	2.0		14	15
	15	0.5		15	15
	16	5.5		16	15

ORIGINAL PAGE IS
OF POOR QUALITY

Limit: 10 % Limit: 20 µsec

* SEE PAGE 13

Test Engineer C. R. Lord Date 11-11-81

Test Supervisor [signature] III Date 11-11-81

Quality Control Stamp 118 ACCEPT CH 2 ONLY Date 11/12/81

NOTE: DATA FOR CHANNELS
1 & 3-16 COPIED FROM
TEST DATA RECORD OF
11-5-81 NCD III
NOV. 19, 1981

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV	SHEET 14

ORIGINAL PAGE IS
OF POOR QUALITY

4.6 Boosted Frequency Response:

Limits (dB)	100Hz 0		1 kHz ±0.5		2 kHz ±0.5		5 kHz ±0.5	
Ch 1	0	db	+0.1	db	+0.1	db	+0.2	db
* 2	0		.2		.2		.4	
3	0		+0.1		+0.1		+0.1	
*4	0		.4		.5		.7	
5	0		+0.2		+0.2		+0.2	
*6	0		.4		.4		.6	
7	0		+0.1		+0.1		+0.1	
*8	0		.4		.5		.6	
9	0		+0.1		+0.1		+0.0	
*10	0		.5		.5		.5	
11	0		+0.1		+0.2		+0.2	
*12	0		.3		.4		.6	
13	0		+0.2		+0.2		+0.5	
*14	0		.3		.4		.6	
15	0		+0.2		+0.3		+0.3	
*16	0		.3		.3		.6	

* SEE SHEET 13A DATED 11-11-81

[illegible] C. R. L[illegible] Date ~~11-12~~ 11-11-81 CRL

[illegible] [illegible] Date 11-11-81

[illegible] CH 4, 6, 8, 10, 12, 14, 16 OUT OF SPEC @ 5 KHZ 1212 Date 11/12/81

FR-8440

NOTE:
DATA FOR ODD CHANNELS
COPIED FROM TEST DATA RECORD OF 10-28-81
N.C.[illegible]
NOV. 19, 1981

SIZE	CODE IDENT NO	NUMBER
A	11323	1659 7

SHEET 15

	10 kHz		20 kHz		[illegible] kHz	
Limits (dB)	-0.[illegible] -0.[illegible]		-[illegible], -[illegible].[illegible]		-(3 +0/-0.5)	
Ch 1	0.0	db	-0.4	db	-2.90	db
* 2	.1		-.4		-2.55	
3	0.0		-0.2		-2.98	
* 4	.7		.4		-2.27	
5	-0.4		-0.6		-3.01 **	
* 6	.5		.2		-2.39	
7	-0.4		-0.96 **		-3.03 **	
* 8	.5		.3		-2.36	
9	-0.2		-0.3		-2.93	
* 10	.2		.1		-2.26	
11	-0.1		-0.3		-2.85	
* 12	.4		.2		-2.38	
13	+0.0		-0.1		-2.77	
* 14	.4		.1		-2.19	
15	-0.2		-0.6		-2.94	
* 16	.6		.5		-2.36	

ORIGINAL PAGE IS OF POOR QUALITY

* SEE SHEET 13

Test Engineer: C. [illegible] Date 11-12-81

Test Supervisor: [illegible] Date 11-12-81

Quality Control [illegible]: SEVERAL OUT OF SPEC CONDITIONS. SEE DATA ABOVE. Date 11/12/81

FR 8440

NOTE:
DATA FOR ODD CHANNELS TAKEN
FROM TEST DATA RECORD OF 10-28-81
** OUT OF SPEC. SEE F.R. 8440

NC III
Nov. 19, 1981

SIZE	CODE IDENT NO.	
A	11323	[illegible]
SCALE	REV [illegible]	SHEET 16

ORIGINAL PAGE IS
OF POOR QUALITY

Channel	Boost Resistor Values	9C96[illegible]-( )	Rolloff Resistor Value	9C96[illegible]-11A or 9C96[illegible]-( )
1	[illegible] 2.80 k	-169	R6[illegible] 29.4k	-267
2 *	~~[illegible] 2.61k~~	~~-166~~	~~[illegible] 22.1k~~	~~-255~~
3	R2 3.01 K	-172	R66 68.1k	-302
4	R10 3.01 K	-172	R74 30.9k	-269
5	[illegible] 2.55 K	-165	[illegible] 29.4K	-267
6	R11 3.01 k	-172	R75 54.9k	-293
7	R4 3.09 K	-173	R6[illegible] 28.0K	-265
8	R12 3.40 K	-177	R7[illegible] 66.5K	-301
9	[illegible] 2.67 K	-167	[illegible] 47.5K	-287
10	[illegible] 3.24 K	-175	[illegible] 80.6K	-309
11	R6 2.87 K	-170	R70 45.3K	-285
12	R1[illegible] 3.57 K	-179	R7[illegible] 45.3K	-285
13	[illegible] 2.43 K	-163	[illegible] 49.9K	-289
14	R1[illegible] 3.16 K	-174	[illegible] 26.7K	-263
15	[illegible] 3.09 K	-173	[illegible] 24.3K	-259
16	R16 3.57 K	-179	R[illegible] 66.5K	-301

Test Engineer C R Lera Date 10-28-81

Test Supervisor Neill C Davidson III Date 10-28-81

118 VERIFY DATA COMPLETE

Quality Control [illegible] Date 11/12/81

*AS OF 11-11-81

R9 2.49K -164 R73 16.2K -242

Neill C Davidson

NOV. 19, 1981

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV J	SHEET 17

4.6

ORIGINAL PAGE IS
OF POOR QUALITY

Channel	Frequency Trim Capacitor Designator	Value	908505 -
1	C33	NONE	NONE
3	C34		
5	C35		
7	C36		
9	C37		
11	C38		
13	C39		
15	C40		
2	C41		
4	C42		
6	C43		
8	C44		
10	C45		
12	C46		
14	C47		
16	C48	NONE	NONE

NOTE: COMPONENT NOT ~~USED~~ NEEDED ON THIS ASSEMBLY

Planning Operation No. 600

Tested by C. R. Lane Date 10-29-81

Test Supervisor Willis C. Davidson III Date 10-29-81

Quality Inspection Stamp 118 REVIEW Date 11/12/81

TITLE

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV J	SHEET 18

Require [illegible]

Ch	METER	POST-AMP OUT (dB)	PRE-AMP OUT (dB)	SCOPE GAIN (dB)	TOTAL COMBINED GAIN	PRE-AMP OUT (mV)	FEEDBACK RESISTOR	WIDEBAND NOISE(nA)
1	.56 Vrms	+3.25	-19.28	27.62	322	1.74	.89	2.0
* 2	~~.56~~ .59	3.09	-18.71		256	1.89	.98	~~1.9~~ 2.0
3	.54	3.14	-18.42		288	1.88	.93	2.0
4	.59	3.00	-18.88		299	1.98	1.07	1.9
5	.51	3.33	-17.06		252	2.03	1.10	1.8
6	.50	3.08	-17.68		262	1.91	1.05	1.8
7	.50	3.24	-18.47		293	1.71	.96	1.8
8	.55	3.13	-18.70		297	1.85	1.04	1.8
9	.50	3.09	-17.38		254	1.97	1.05	1.9
10	.53	3.11	-18.46		288	1.84	.92	2.0
11	.55	3.55	-17.87		283	1.94	1.00	1.9
12	.54	3.15	-19.38		322	1.68	.91	1.8
13	.52	3.19	-17.28		264	2.05	1.05	2.0
14	.60	3.19	-19.24		318	1.89	.97	2.0
15	.49	3.15	-19.03		309	1.59	.87	1.8
16	.60	3.63	-19.00	27.62	325	1.84	.98	1.9

* REFER TO TEST DATA RECORD OF 11-11-81 AFTER CHANNEL 2 RESELECT NC[illegible]
NOV. 19, 1981

Test Engineer C. R. [illegible] Date 10-29-81

Test Supervisor [illegible] Date 10-29-81

Quality Control Stamp 118 ACCEPT Date 11/12/81

ORIGINAL PAGE IS OF POOR QUALITY

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV	SHEET

ORIGINAL PAGE IS
OF POOR QUALITY

Crosstalk

Limit: -40 dB -60 dB

Source Channel	Nearest Neighbors								Average of Non-Neighbors	
1					2	-74	3	-45	-63	
2			1	-42	3	-58	4	-44	-59	*
3	1	-43	2	-62	4	-68	5	-45	-63	
4	2	-45	3	-40	5	-57	6	-42	-63	
5	3	-45	4	-62	6	-68	7	-45	-60	
6	4	-44	5	-51	7	-64	8	-48	-63	
7	5	-42	6	-60	8	-72	9	-47	-62	
8	6	-43	7	-48	9	-58	10	-50	-60	
9	7	-45	8	-57	10	-66	11	-45	-60	
10	8	-48	9	-44	11	-57	12	-48	-64	
11	9	-48	10	-63	12	-73	13	-42	-61	
12	10	-47	11	-46	13	-52	14	-43	-61	
13	11	-45	12	-60	14	-69	15	-46	-60	
14	12	-47	13	-47	15	-52	16	-41	-62	
15	13	-47	14	-59	16	-61			-60	
16	14	-46	15	-59					-62	

Test Engineer C. R. Lane Date 11-12-81

Test Supervisor Verill C. Davidson III Date 11-12-81

Quality Control Stamp * STARRED CROSSTALK OUT OF SPEC Date 11/12/81

FR 8440

FINAL TEST AFTER GROUND PLANE FIX AND CH 2 RESELECT

SIZE	CODE IDENT NO	DRAWING NO
A	11323	16397

SCALE | SHEET 27

4.9 Ground Continuity and Isolation

REQUIREMENTS:

Signal GND Continuity	6.5 ohms	Limit: (< 11 ohms)	
Signal GND-Pwr Gnd Isolation	✓	OK	(>1 M ohms)
Signal GND-Chassis Isolation	✓	OK	(>1 M ohms)
J1-16 ODD to J1-16 EVEN	✓	OK	(<25 ohms all bands)

4.10 Time Delay

Channel	Rise Time	Fall Time
1	9.8	15.2
2	9.6	15.0
3	9.6	15.0
4	9.8	15.4
5	9.2	15.0
6	9.4	14.6
7	9.0	14.4
8	9.4	14.8
9	9.2	14.6
10	9.6	15.0
11	9.4	14.6
12	9.6	15.6
13	9.8	15.2
14	9.4	14.8
15	9.8	15.4
16	9.8	15.4

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer C. R. Lane Date 11-05-81

Test Supervisor Keith C. Davison Date 11-5-81

VERIFY DATA COMPLETE

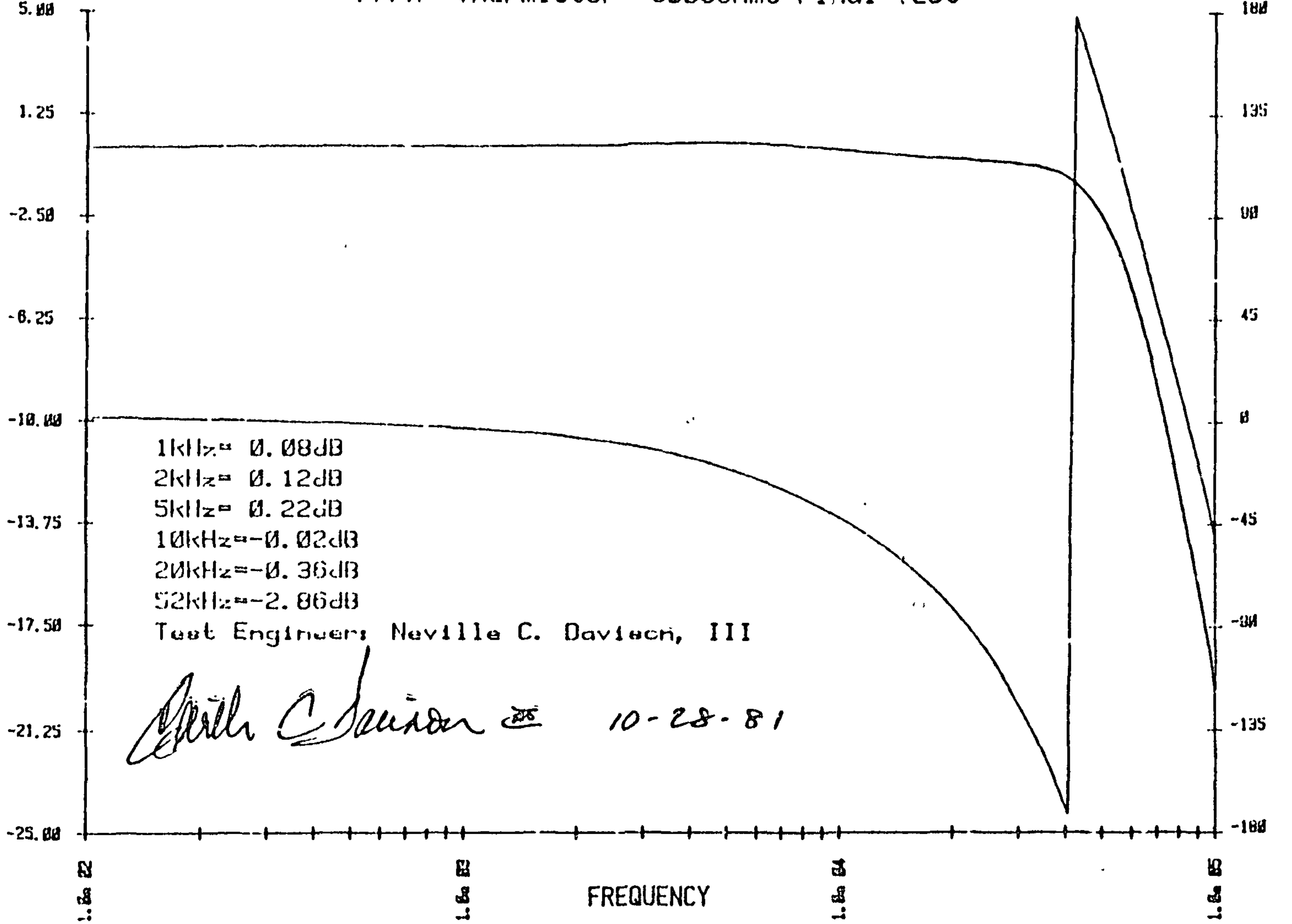
Quality Control I 118 Date 11/12/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

SCALE

HEWLETT PACKARD

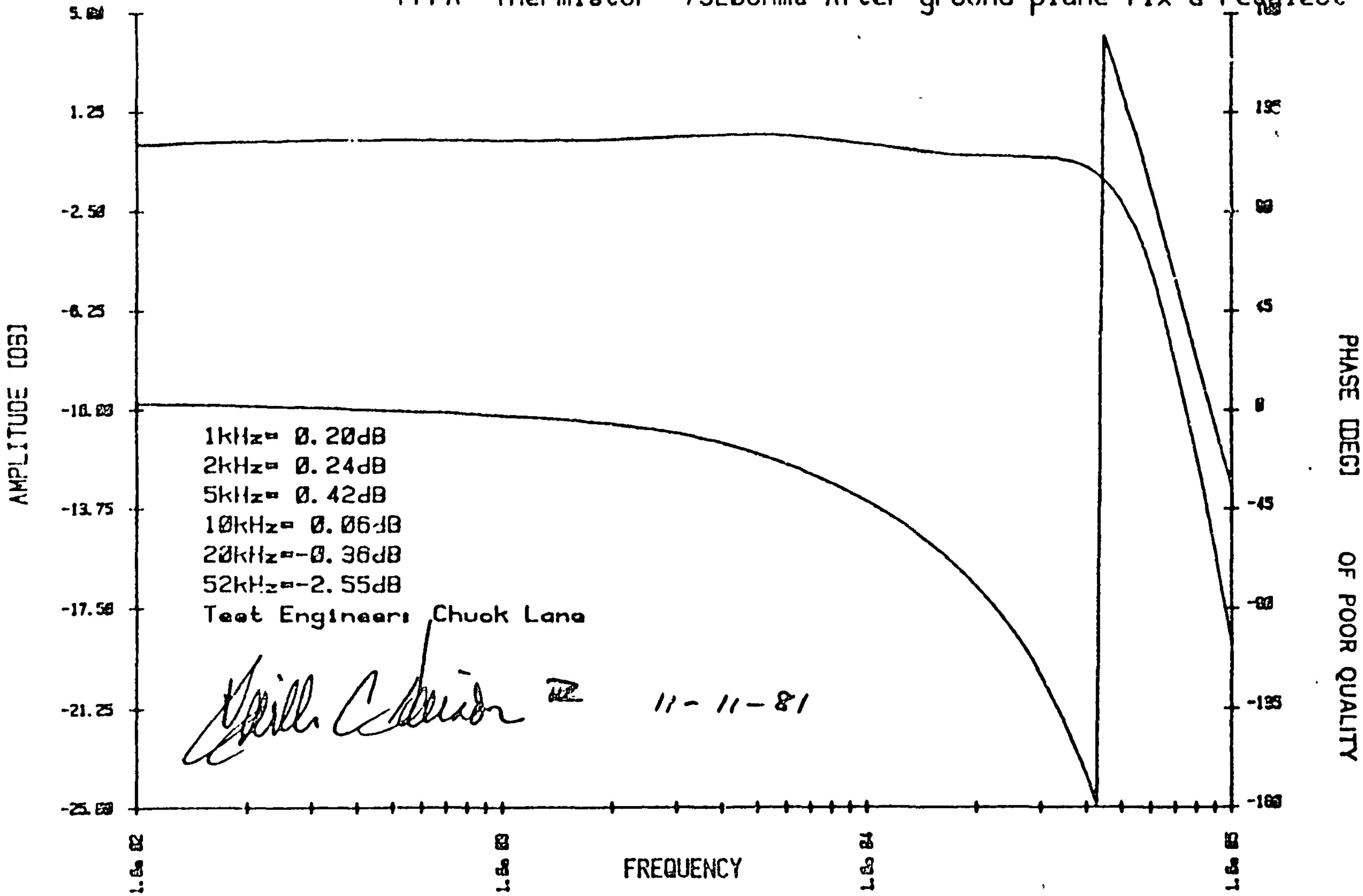
BAND 1 CHANNEL 1 October 28, 1981
PFPA Thermistor= 8000ohms Final Test



PHASE (DEG)

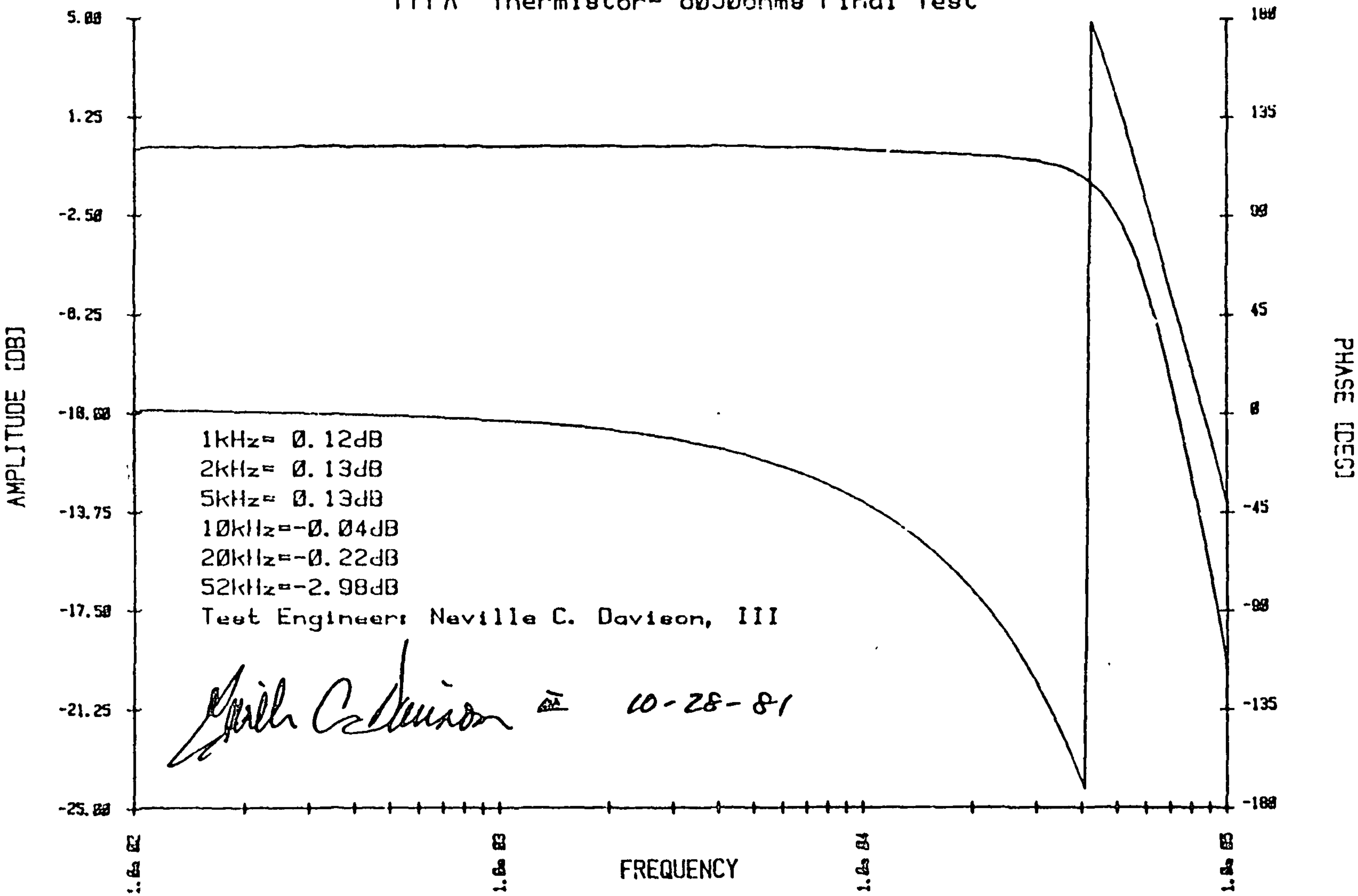
BAND 1 CHANNEL 2 11/11/81

PFPA Thermistor= 7920ohms After ground plane fix & reselect



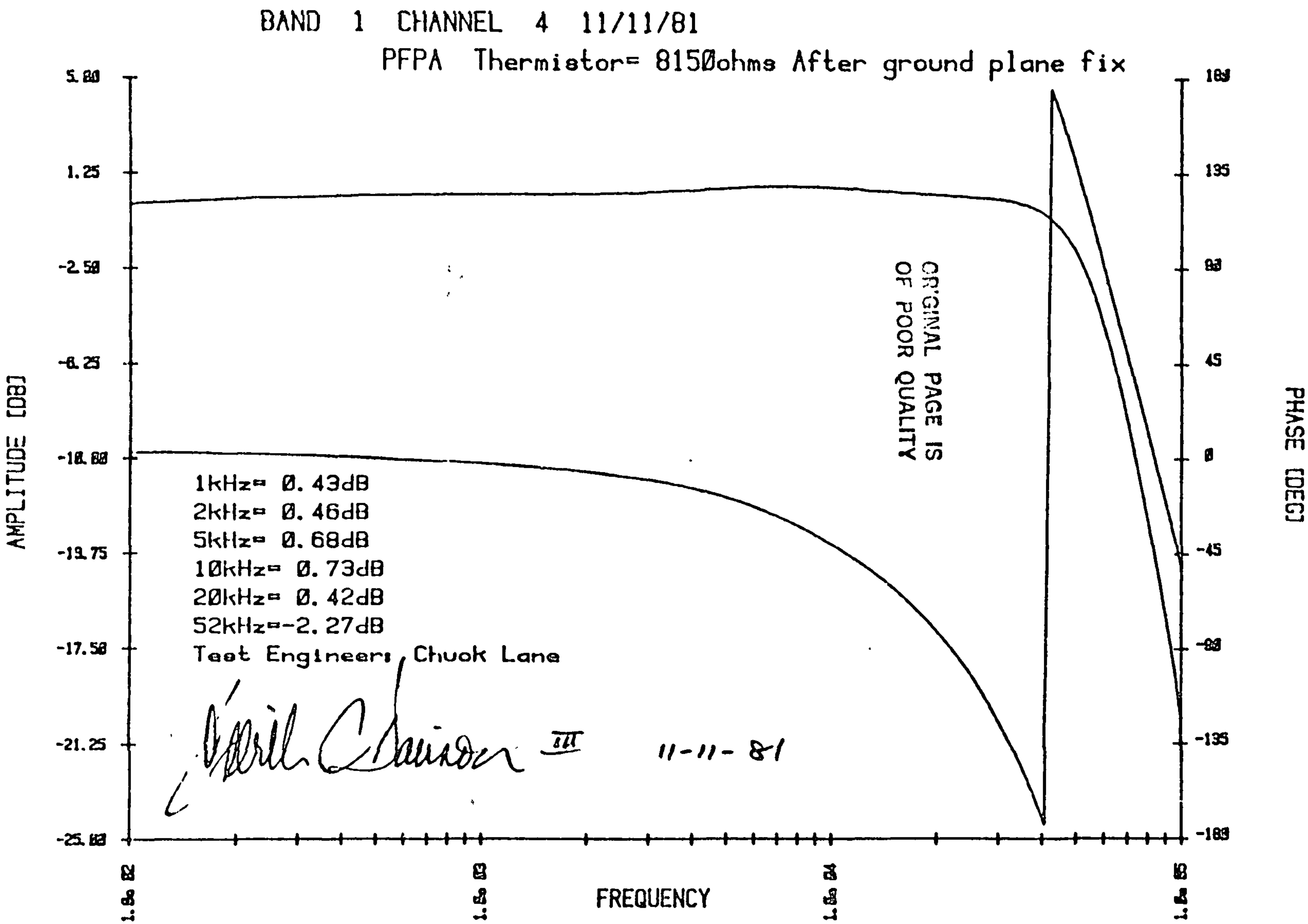
BAND 1 CHANNEL 3 October 28, 1981

PFPA Thermistor= 8050ohms Final Test



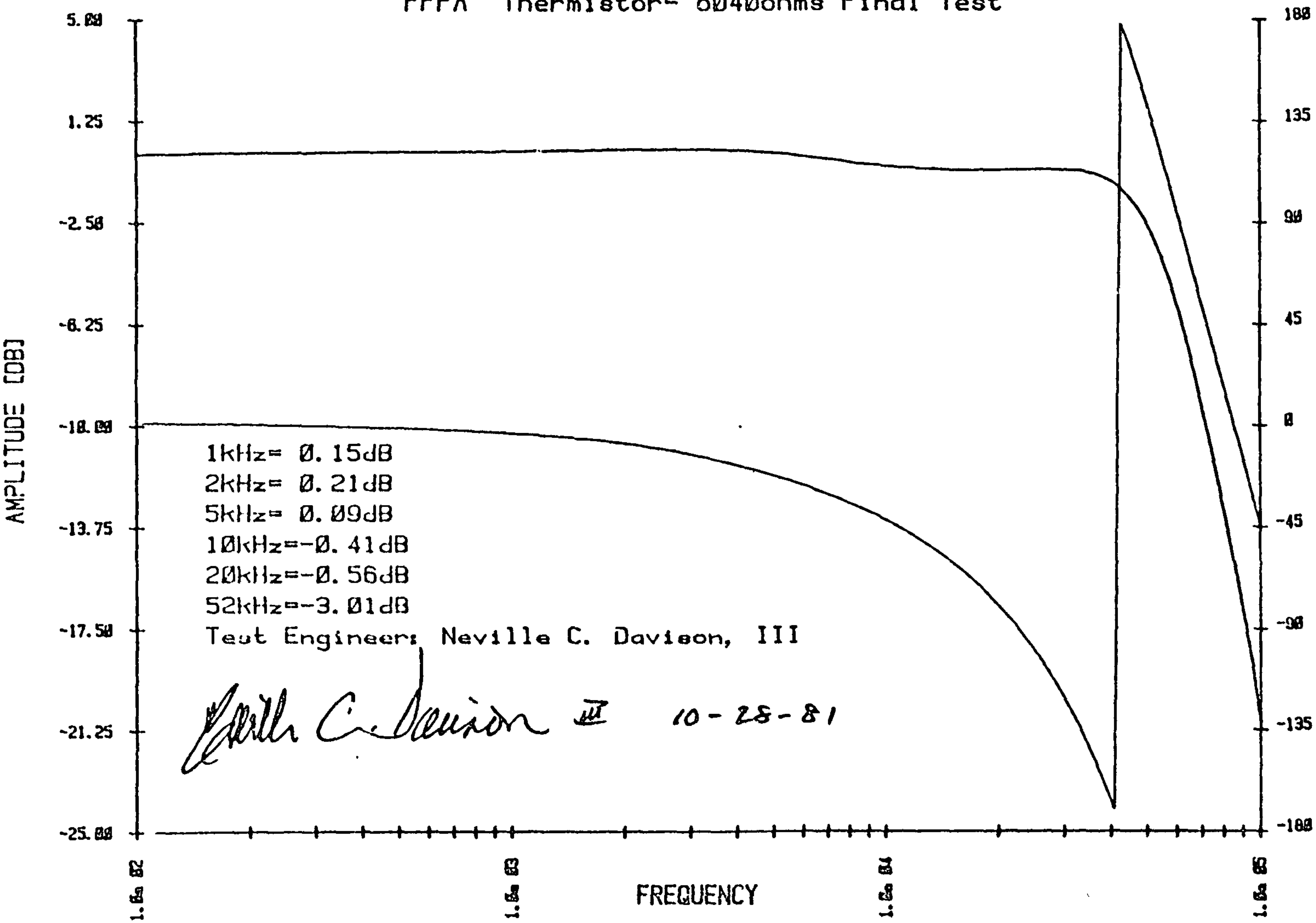
ORIGINAL PAGE IS OF POOR QUALITY

HEWLETT PACKARD



HEWLETT PACKARD

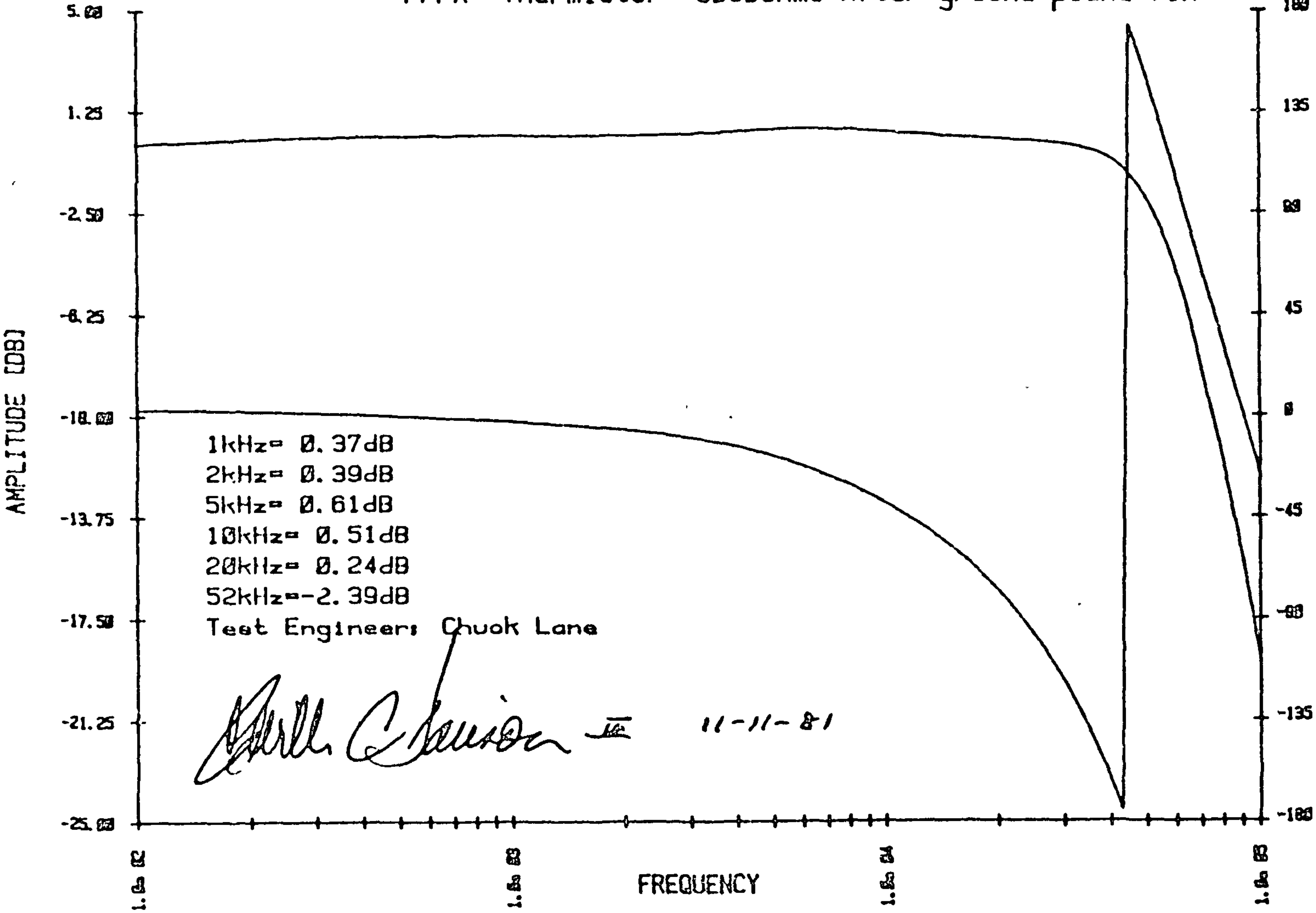
BAND 1 CHANNEL 5 October 28, 1981
PFPA Thermistor= 8040ohms Final Test



CT

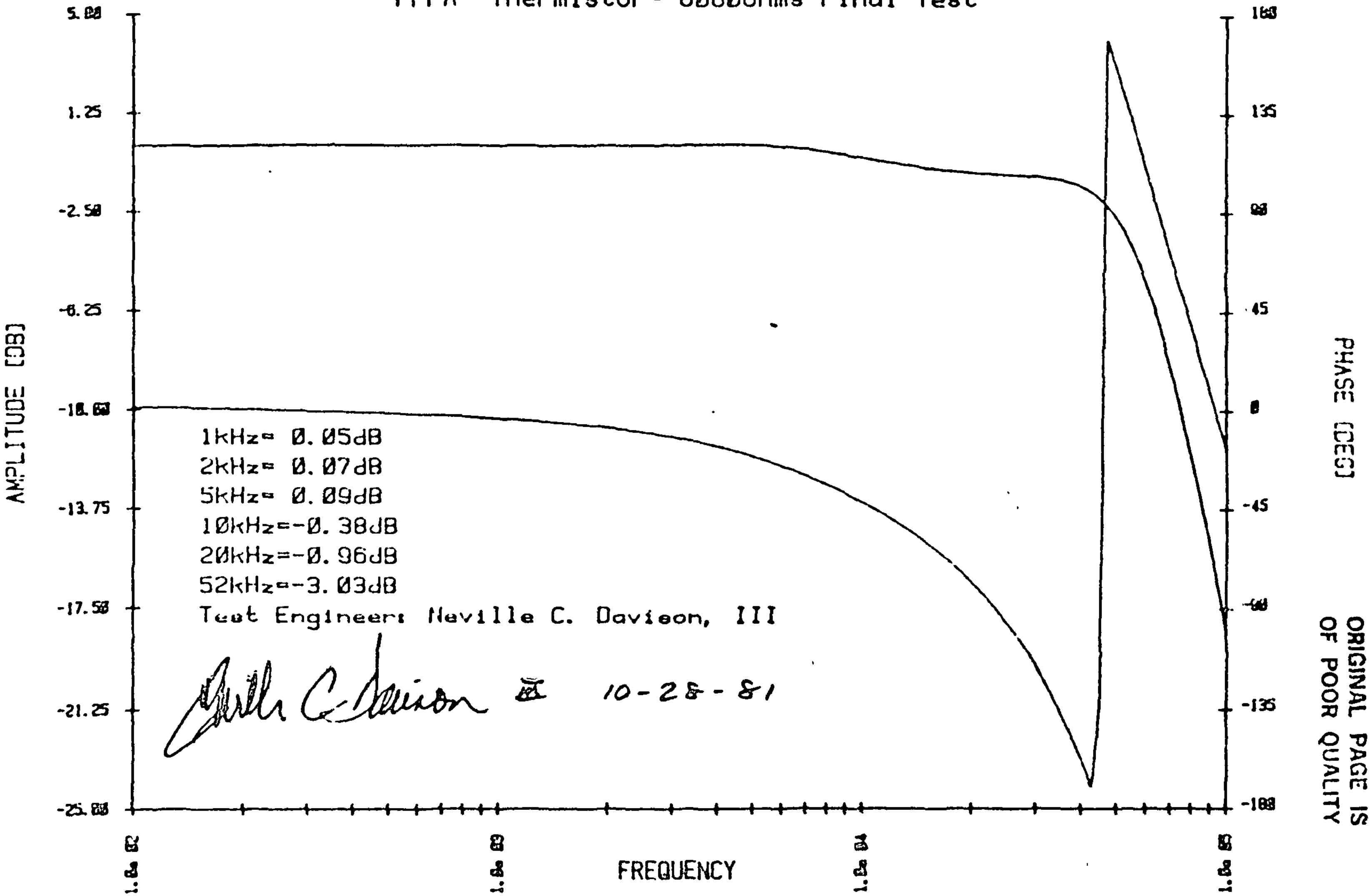
BAND 1 CHANNEL 6 11/11/81

PFPA Thermistor= 8060ohms After ground plane fix

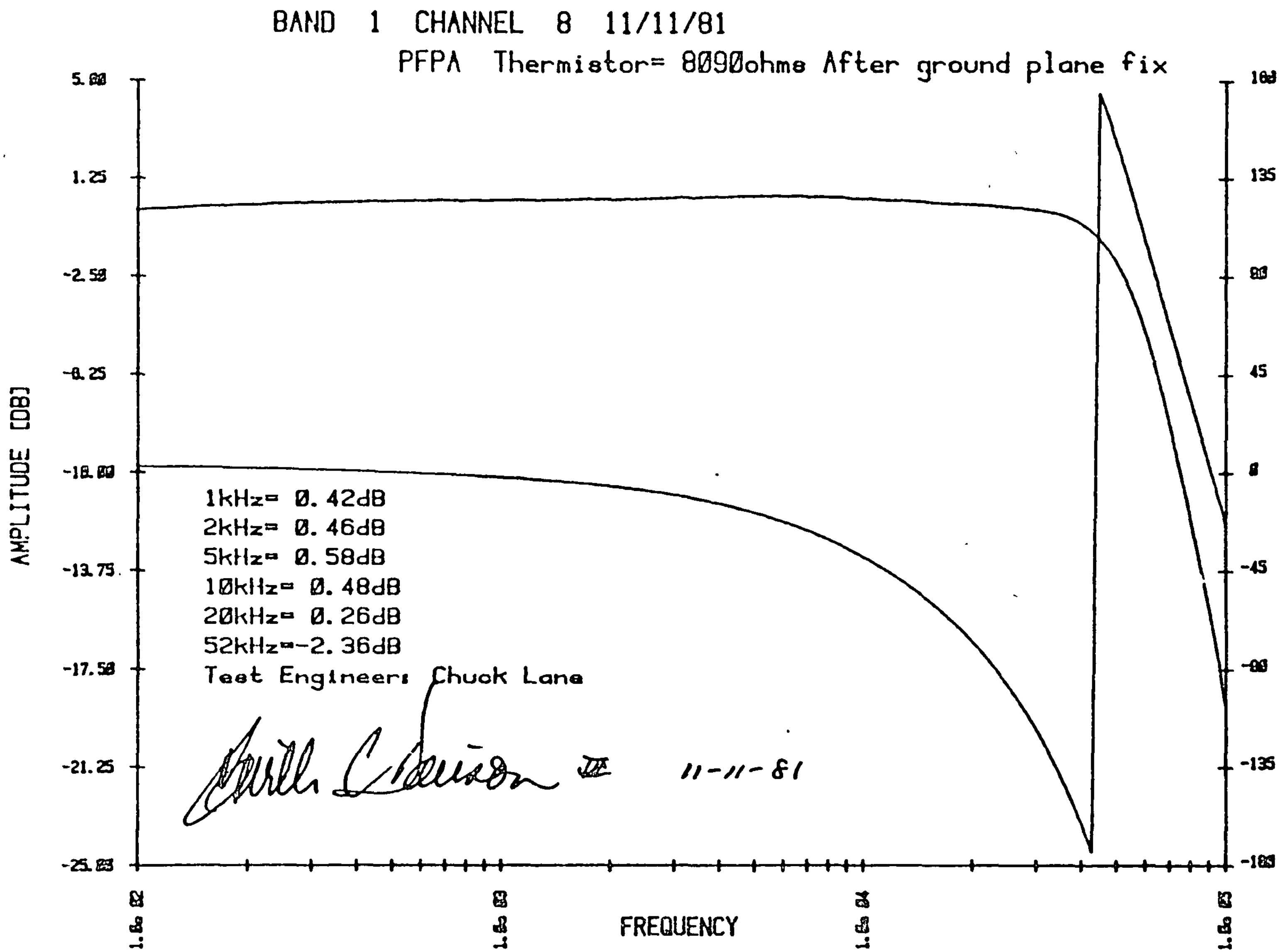


BAND 1 CHANNEL 7 October 28, 1981

PFPA Thermistor= 8080ohms Final Test

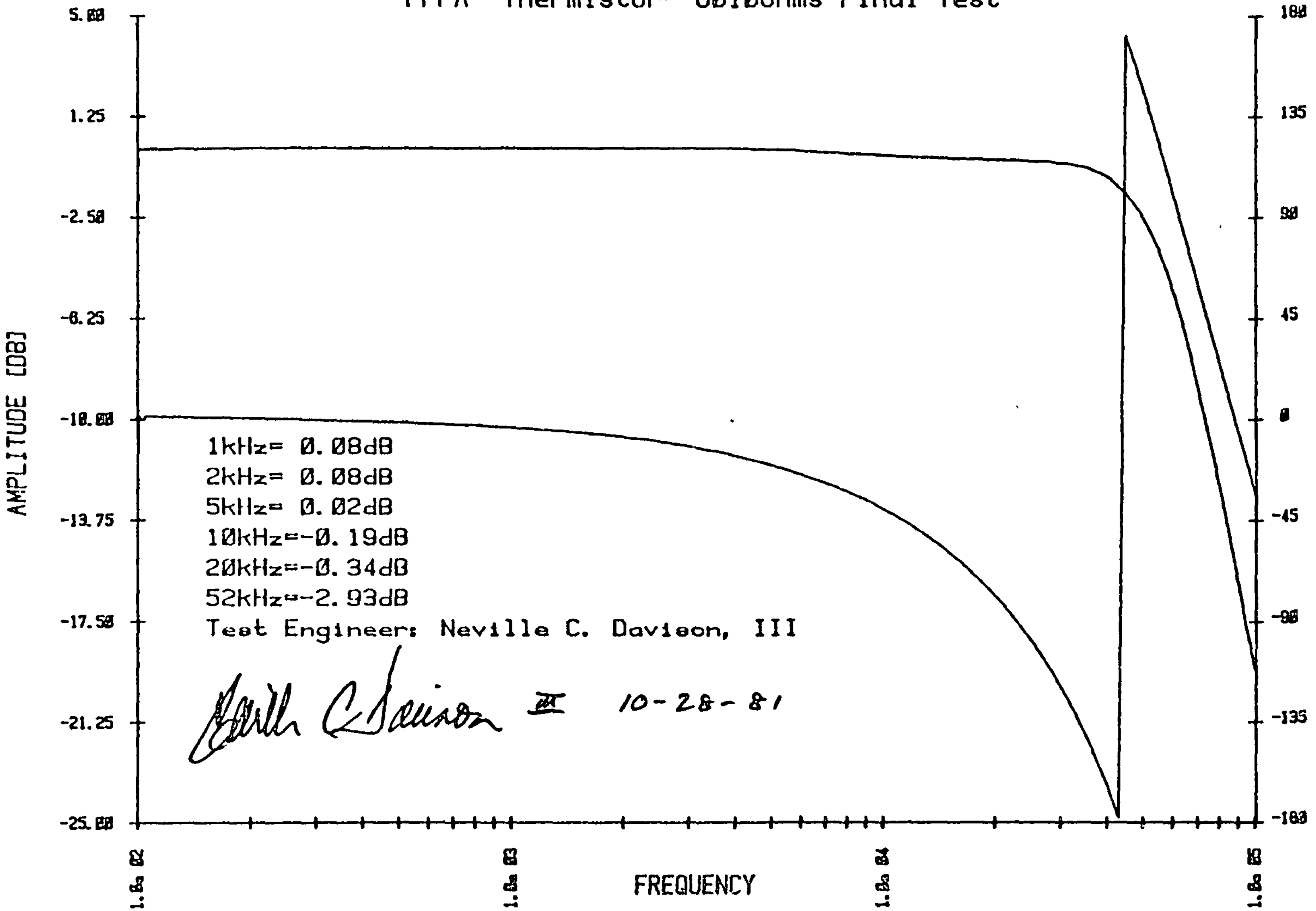


HEWLETT PACKARD



BAND 1 CHANNEL 9 October 28, 1981

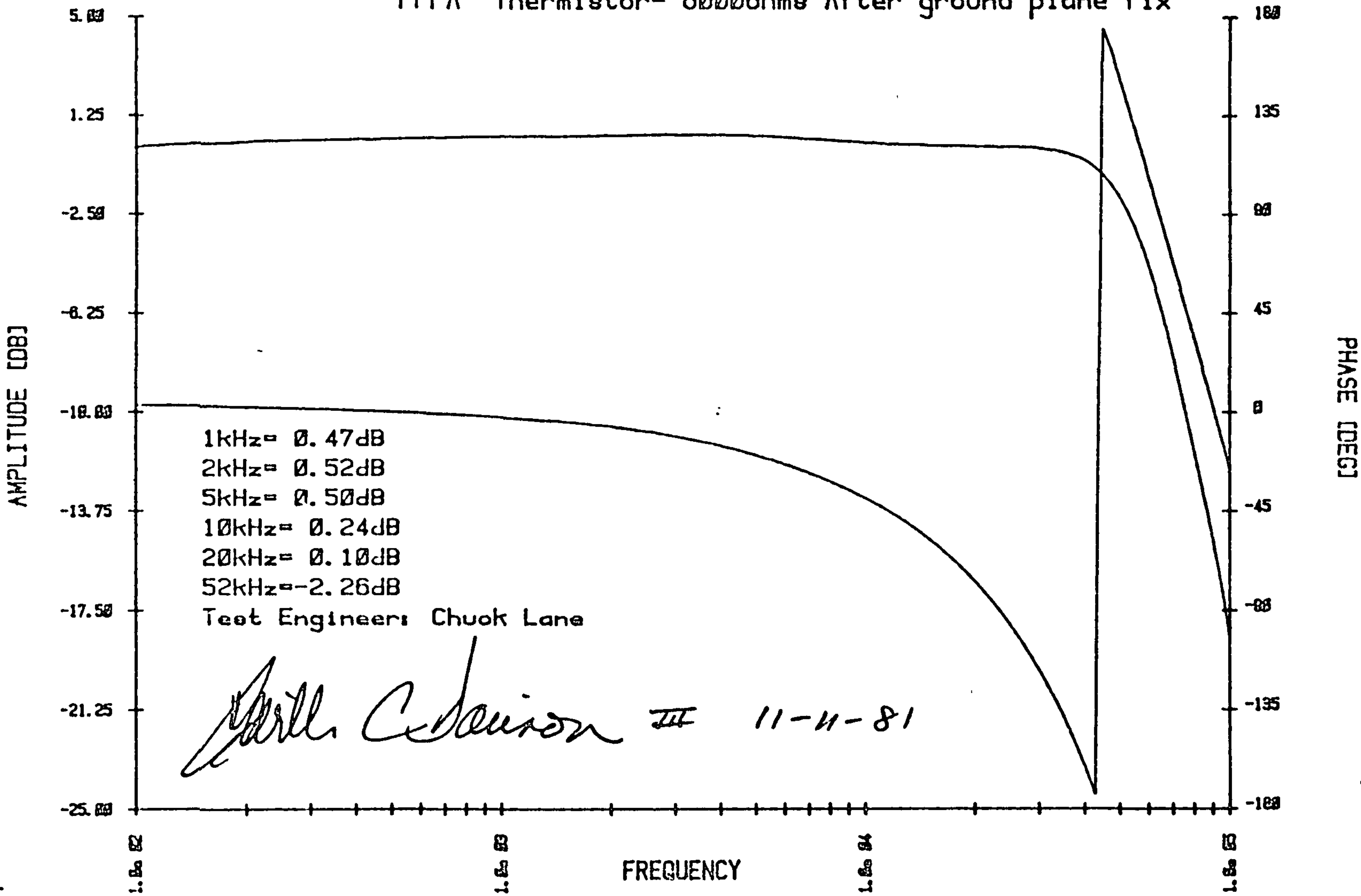
PFPA Thermistor= 8010ohms Final Test



HEWLETT PACKARD

BAND 1 CHANNEL 10 11/11/81

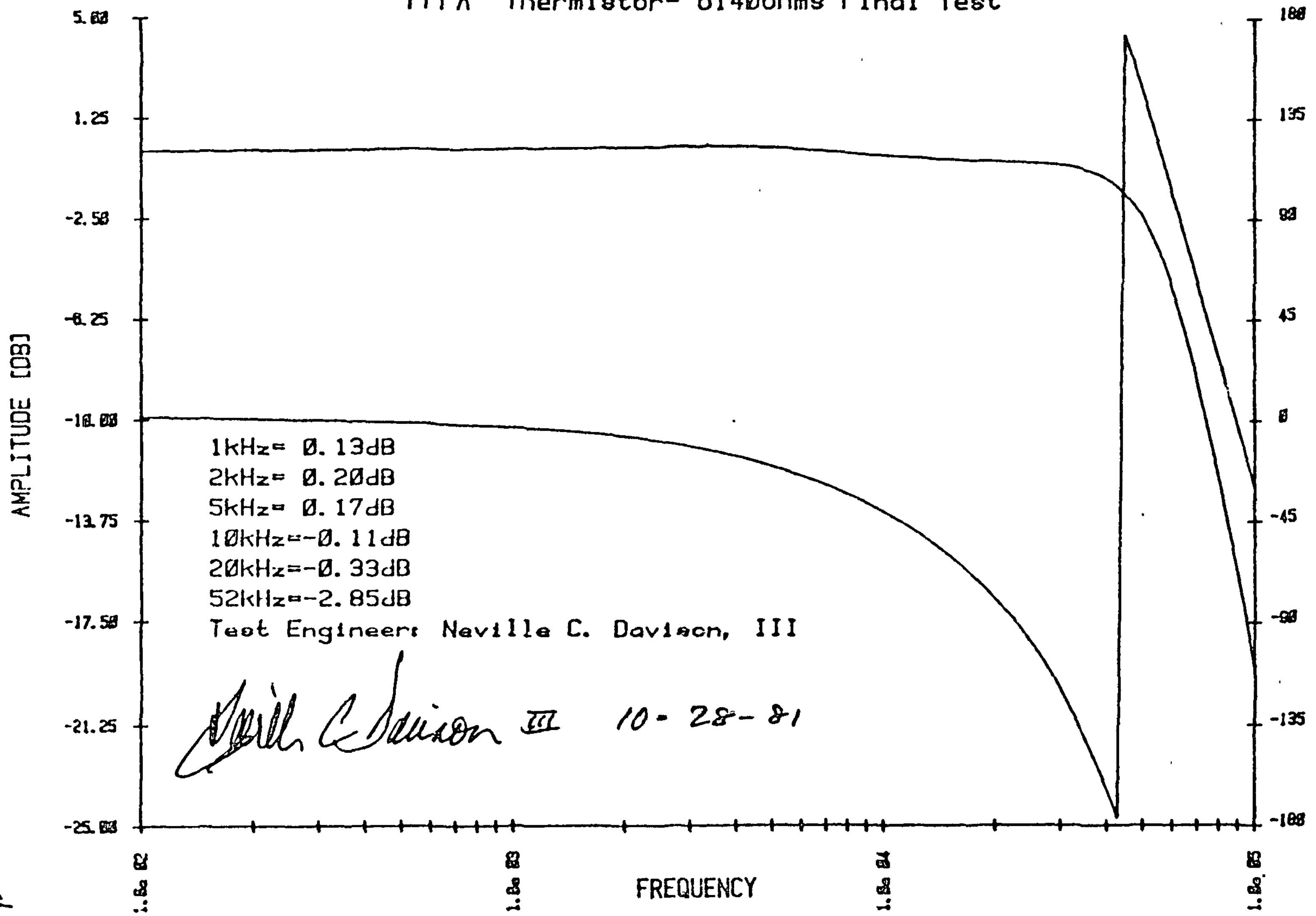
PFPA Thermistor= 8000ohms After ground plane fix



ORIGINAL PAGE IS OF POOR QUALITY

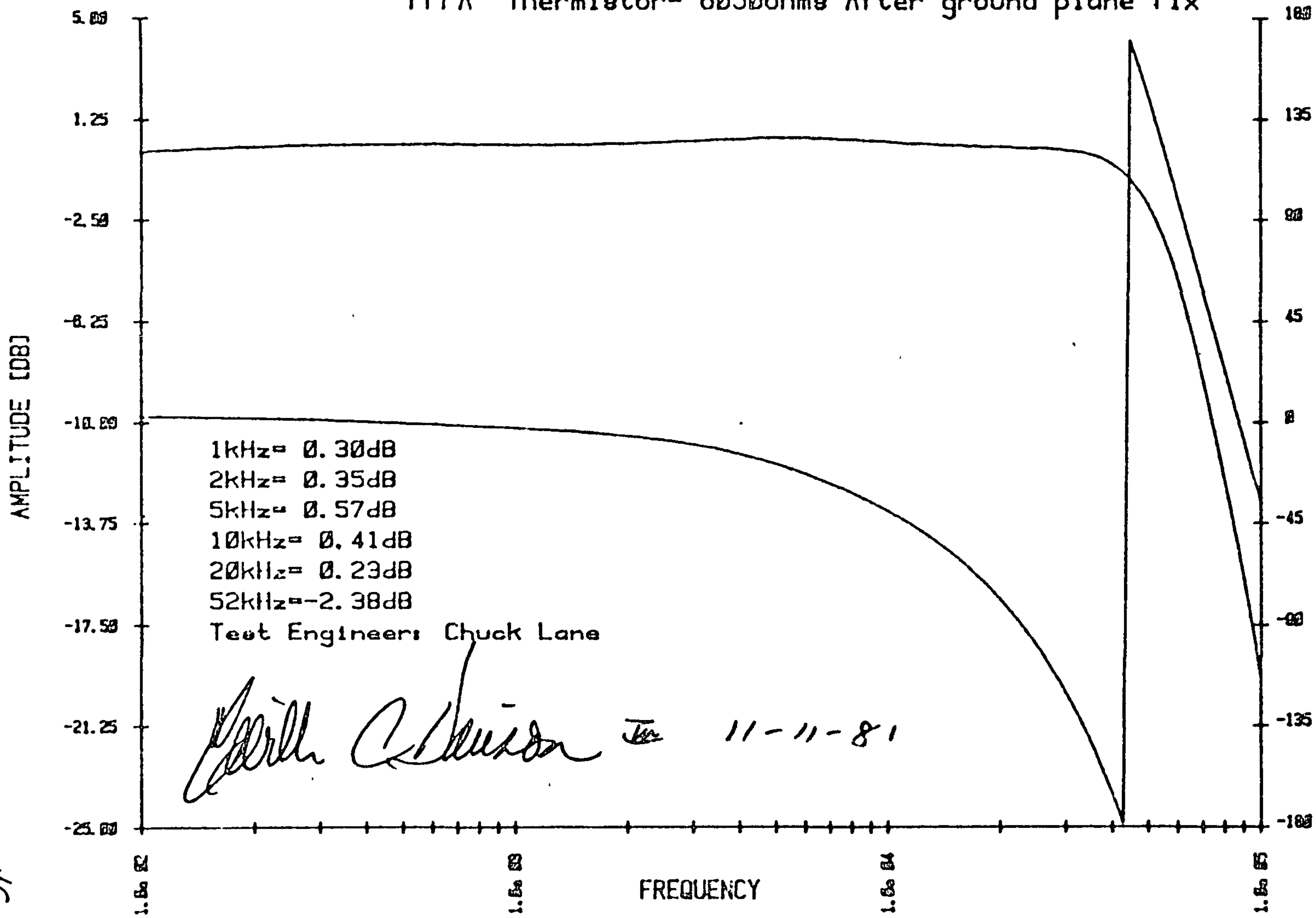
47

BAND 1 CHANNEL 11 October 28, 1981
PFPA Thermistor= 8140ohms Final Test



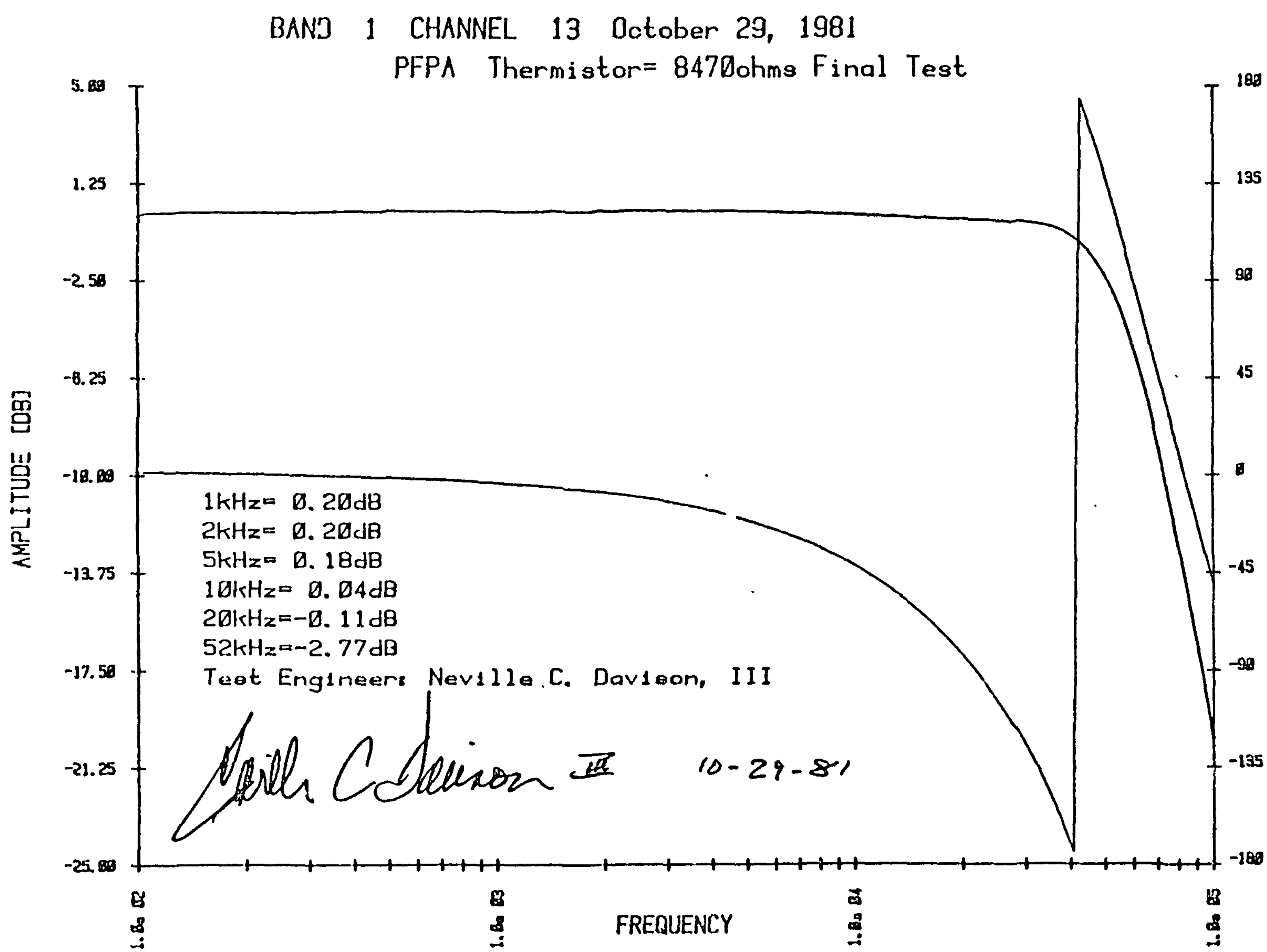
BAND 1 CHANNEL 12 11/11/81

PFPA Thermistor= 8050ohms After ground plane fix



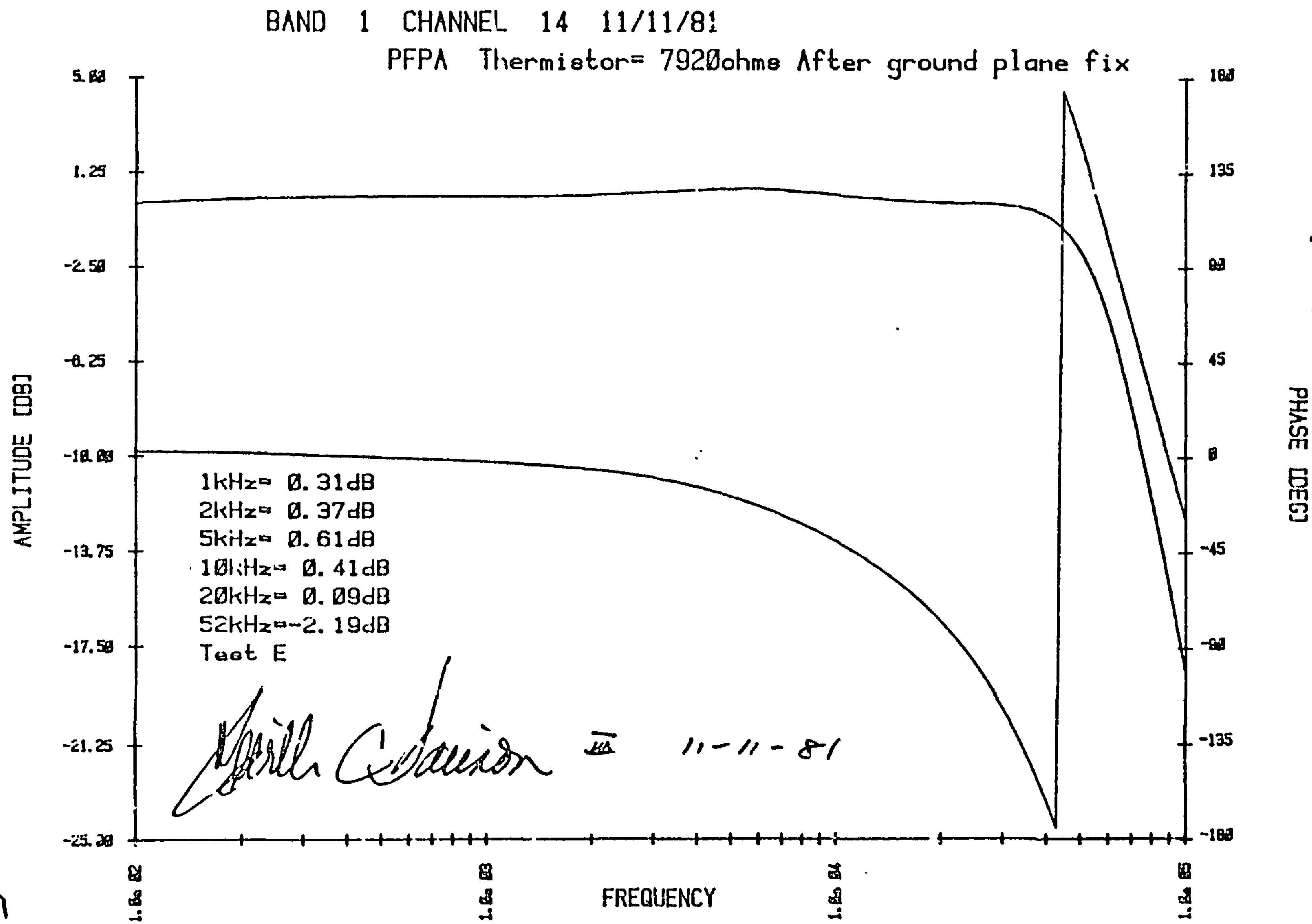
ORIGINAL PAGE IS
OF POOR QUALITY

45



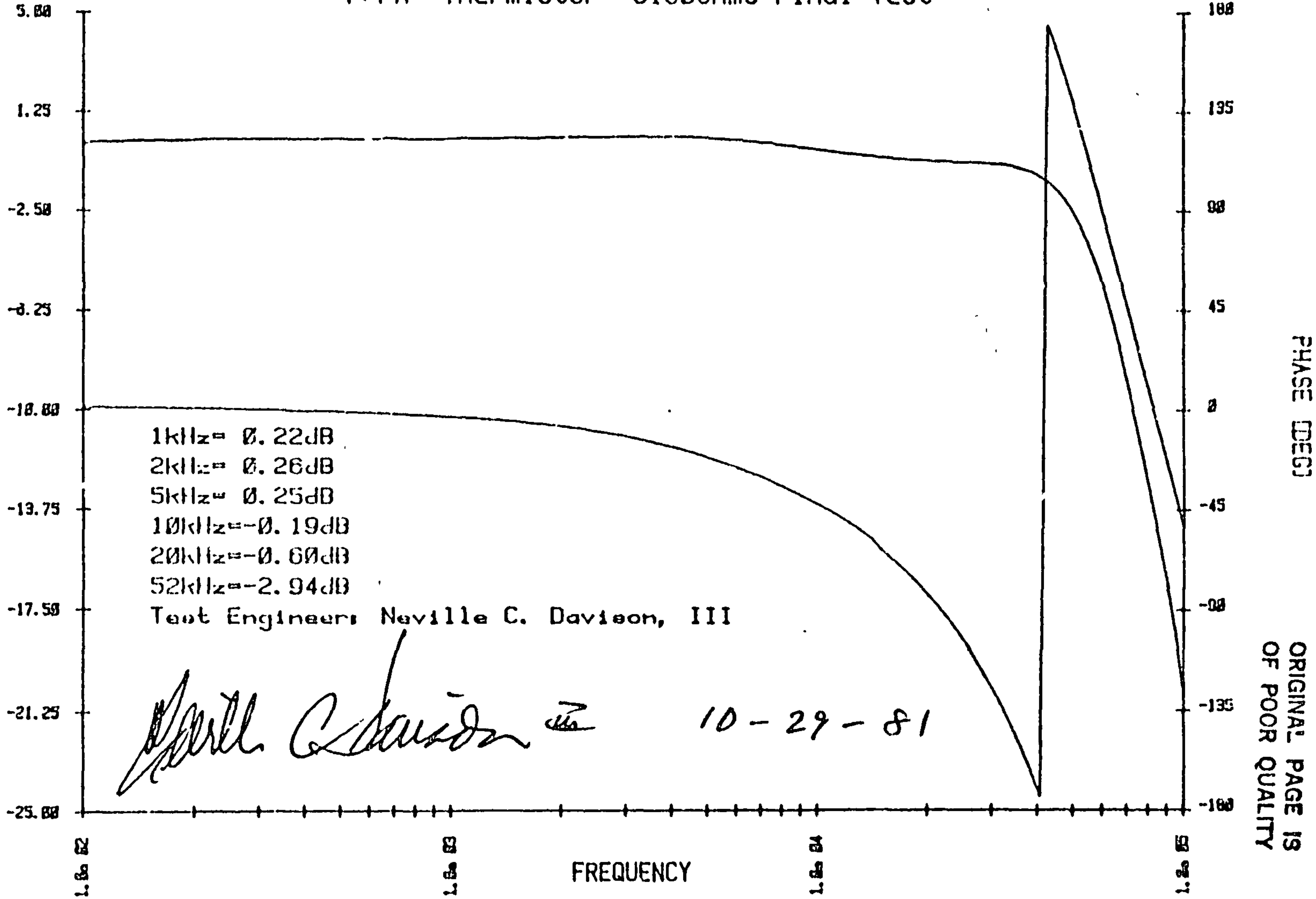
ORIGINAL PAGE IS
OF POOR QUALITY

50


BAND 1 CHANNEL 14 11/11/81
PFPA Thermistor= 7920ohms After ground plane fix
AMPLITUDE [DB]
PHASE [DEG]
FREQUENCY
1kHz= 0.31dB
2kHz= 0.37dB
5kHz= 0.61dB
10kHz= 0.41dB
20kHz= 0.09dB
52kHz=-2.19dB
Test E
11-11-81

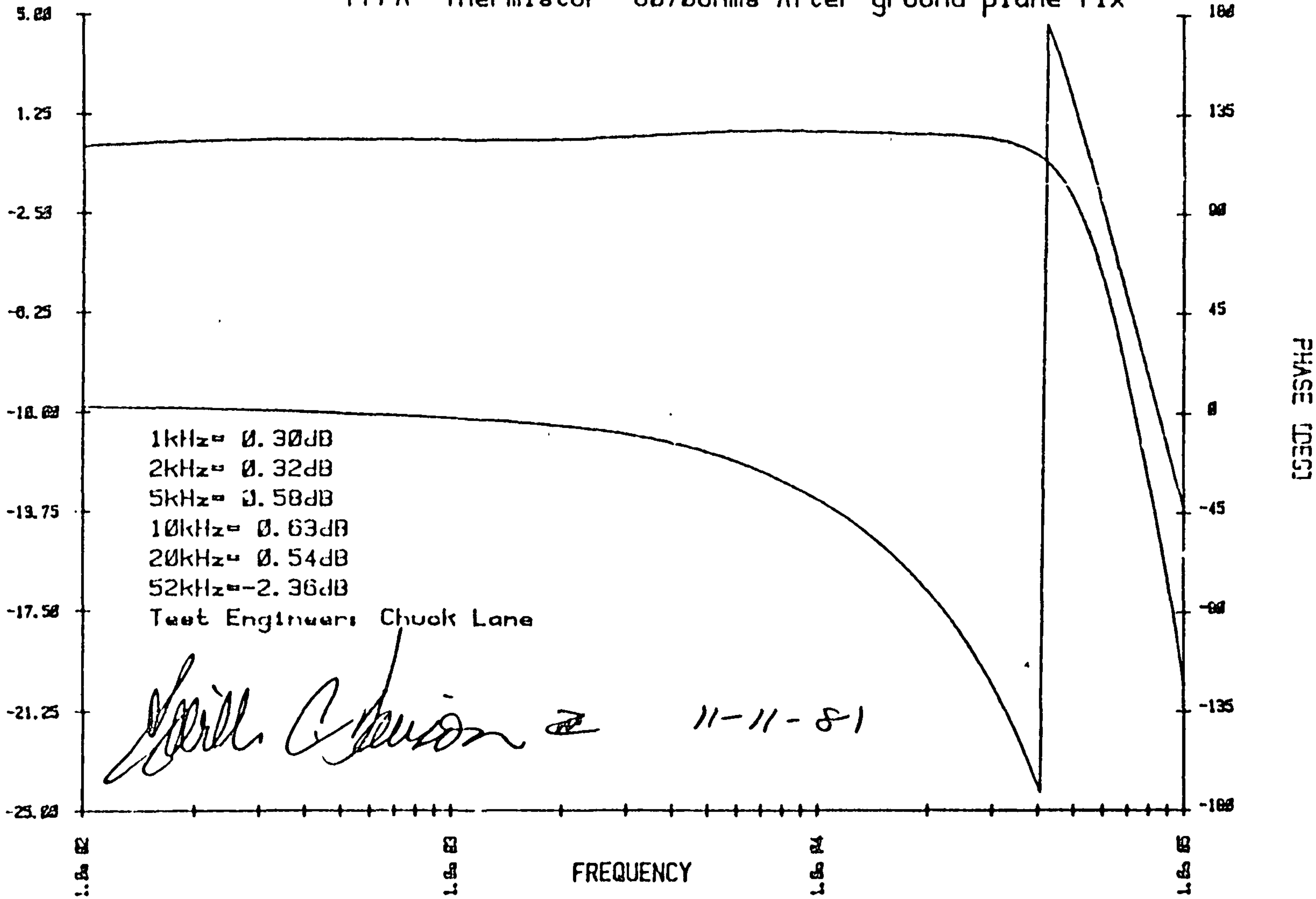
15

BAND 1 CHANNEL 15 October 29, 1981
PFPA Thermistor= 8160ohms Final Test



BAND 1 CHANNEL 16 11/11/81

PFPA Thermistor= 8070ohms After ground plane fix



11-12-81

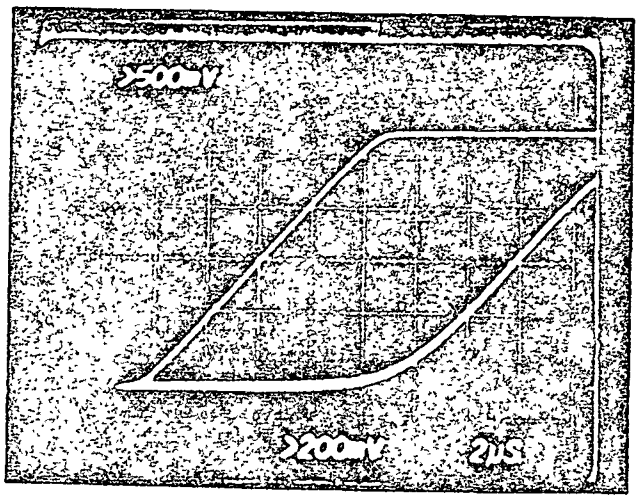
Prime focal plane crosstalk Band 1
50000 Hz

Ch.	nearest neighbors				Average Non-neighbors
Limits:	-40dB				-60dB
1			Ch 2=-74	Ch 3=-45	Average=-63
2		Ch 1=-42	Ch 3=-58	Ch 4=-44	Average=-59
3	Ch 1=-43	Ch 2=-62	Ch 4=-68	Ch 5=-45	Average=-63
4	Ch 2=-45	Ch 3=-40	Ch 5=-57	Ch 6=-42	Average=-63
5	Ch 3=-45	Ch 4=-62	Ch 6=-68	Ch 7=-45	Average=-60
6	Ch 4=-44	Ch 5=-51	Ch 7=-64	Ch 8=-48	Average=-63
7	Ch 5=-42	Ch 6=-60	Ch 8=-72	Ch 9=-47	Average=-62
8	Ch 6=-43	Ch 7=-48	Ch 9=-58	Ch 10=-50	Average=-60
9	Ch 7=-45	Ch 8=-57	Ch 10=-66	Ch 11=-45	Average=-60
10	Ch 8=-48	Ch 9=-44	Ch 11=-57	Ch 12=-48	Average=-64
11	Ch 9=-48	Ch 10=-63	Ch 12=-73	Ch 13=-42	Average=-61
12	Ch 10=-47	Ch 11=-46	Ch 13=-52	Ch 14=-43	Average=-61
13	Ch 11=-45	Ch 12=-60	Ch 14=-69	Ch 15=-46	Average=-60
14	Ch 12=-47	Ch 13=-47	Ch 15=-52	Ch 16=-41	Average=-62
15	Ch 13=-47	Ch 14=-59	Ch 16=-61		Average=-60
16	Ch 14=-46	Ch 15=-59			Average=-62

Test engineer Chuck Lane

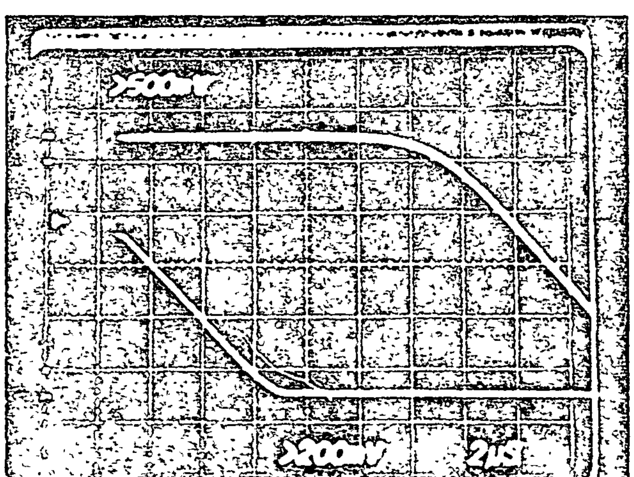
III 11-12-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 1

DELAY TIME
9.8 µSec



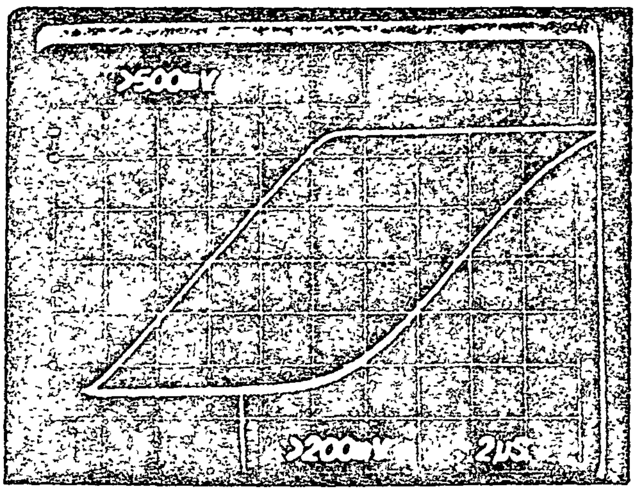
BAND 1
CHANNEL 1

DELAY TIME
15.2 µSec

N.C. Davison

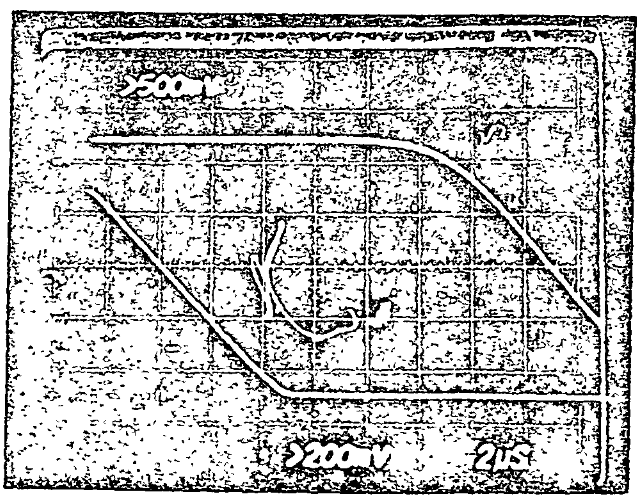
DATE: 11-25-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #1
CHANNEL 2

DELAY TIME
9.6 μSec



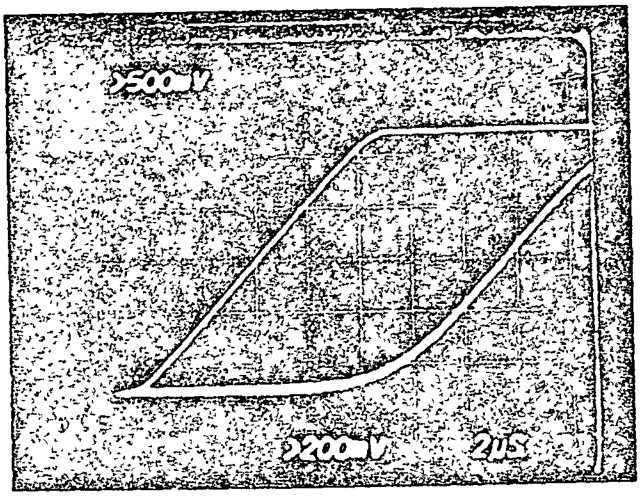
BAND #1
CHANNEL 2

DELAY TIME
15.0 μSec

N. C. Davison

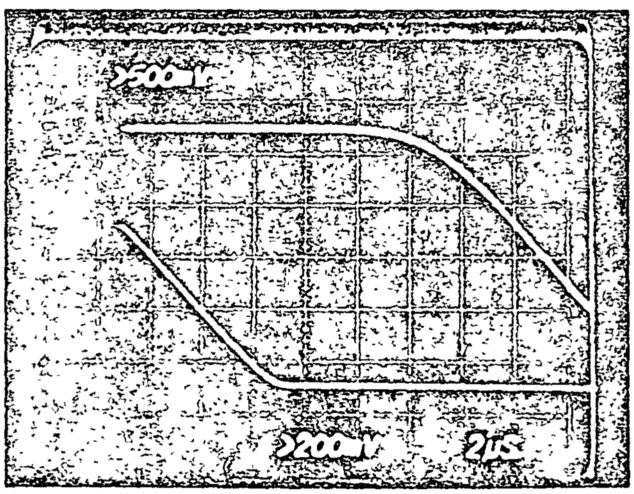
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND ~~8~~ 2
CHANNEL 3

DELAY TIME
9.6 μSec



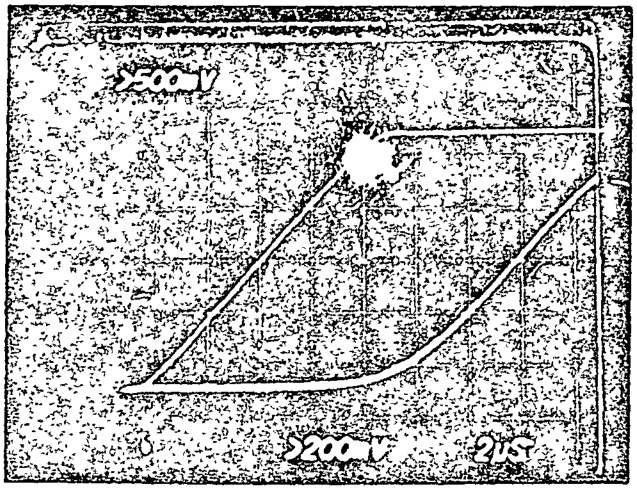
BAND ~~2~~ 1
CHANNEL 3

DELAY TIME
15.0 μSec

N.C. DAVISON

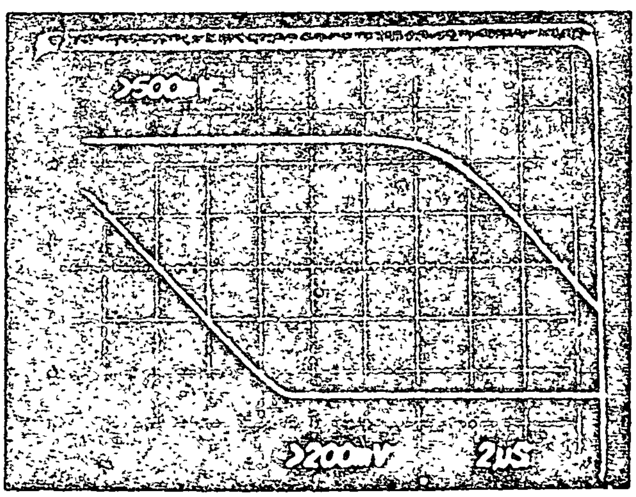
DATE: 11-05-87

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #1
CHANNEL 4

DELAY TIME
9.8 μSec



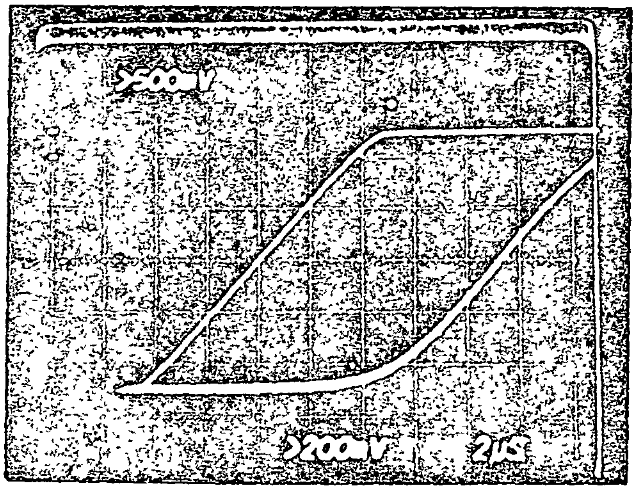
BAND 1
CHANNEL 4

DELAY TIME
15.4 μSec

N.C. DAVISON

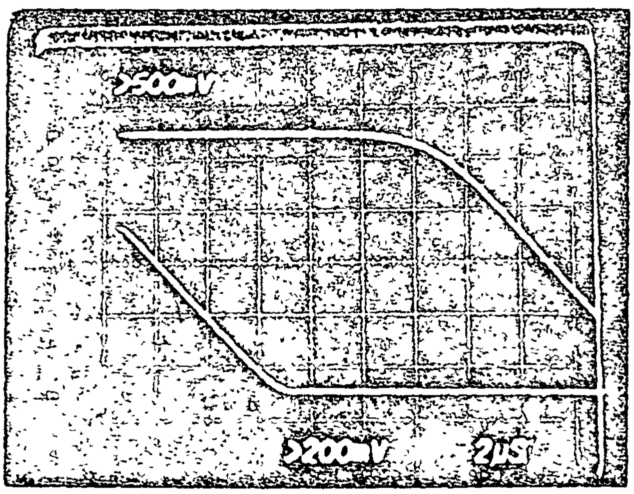
DATE: 11.05.81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 5

DELAY TIME
9.2 μSec



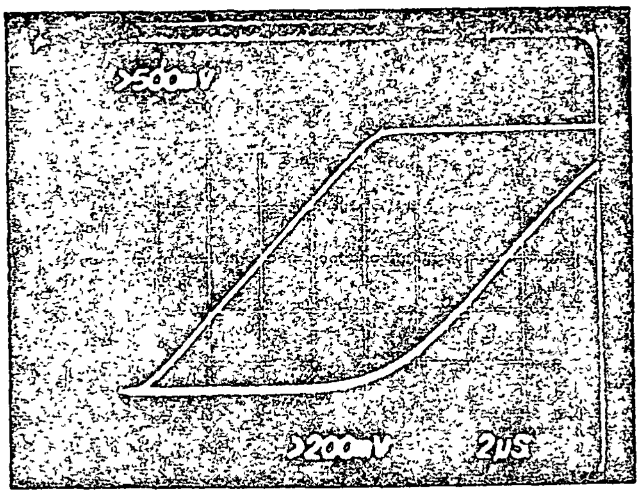
BAND 1
CHANNEL 5

DELAY TIME
15.0 μSec

N.C. DAVISON

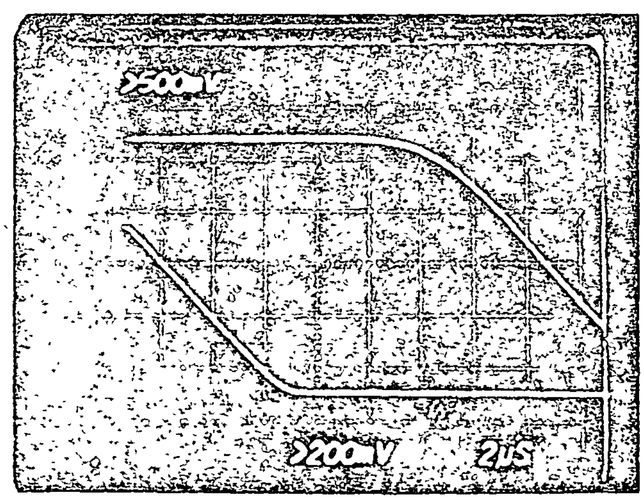
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 6

DELAY TIME
9.4 µSec



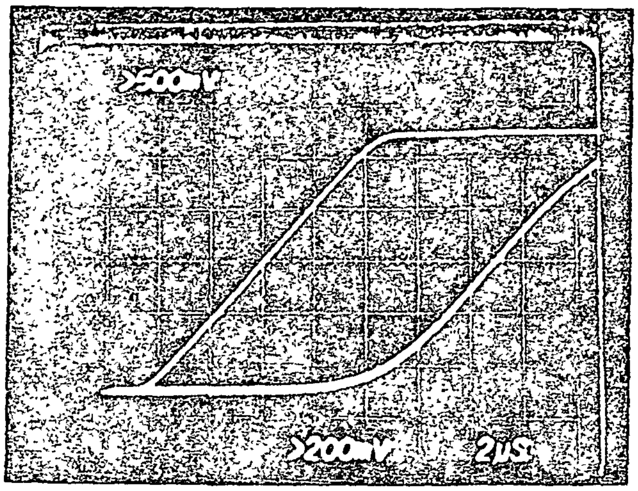
BAND 1
CHANNEL 6

DELAY TIME
14.6 µSec

N.C. DAVISON

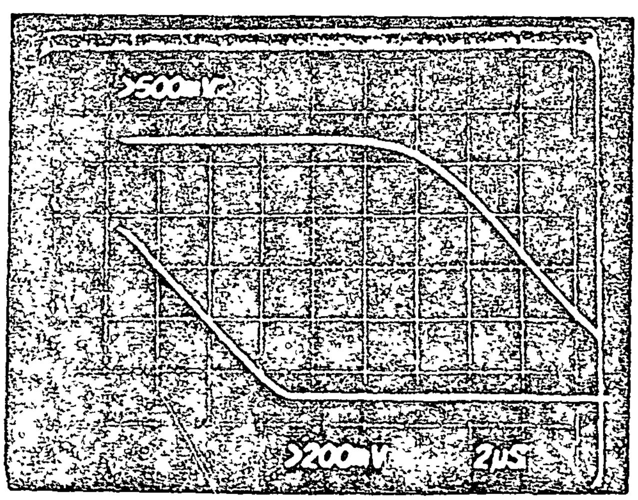
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 7

DELAY TIME
9.0 µSec



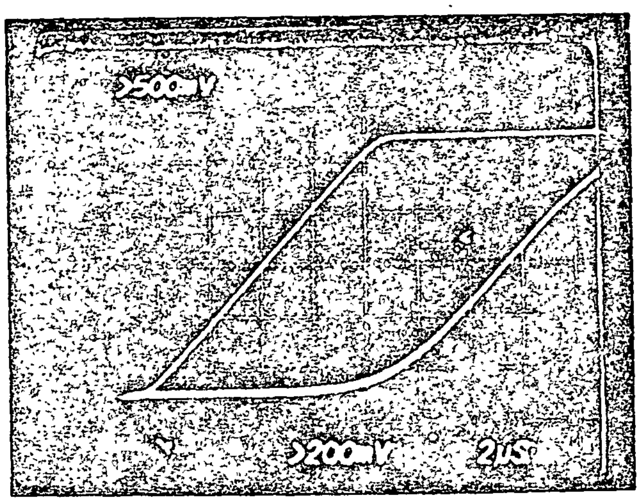
BAND 1
CHANNEL 7

DELAY TIME
14.4 µSec

N.C. DAVISON

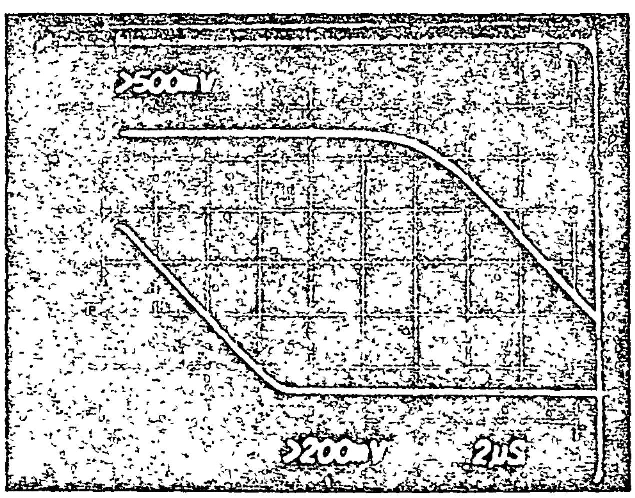
DATE: 11-05-87

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 8

DELAY TIME
9.4 μSec



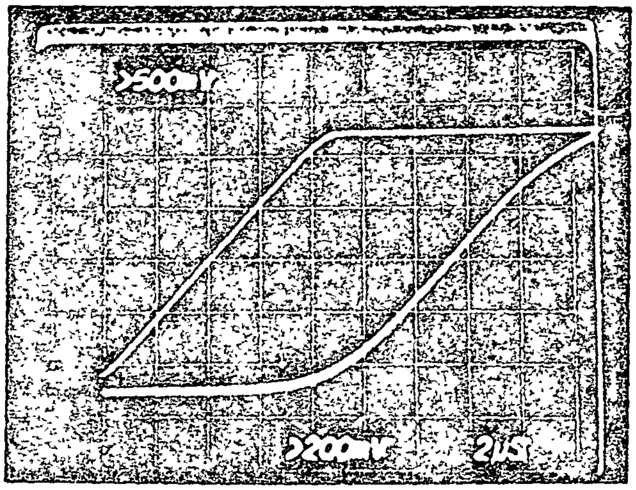
BAND 1
CHANNEL 8

DELAY TIME
14.8 μSec

N.C. DAVISON

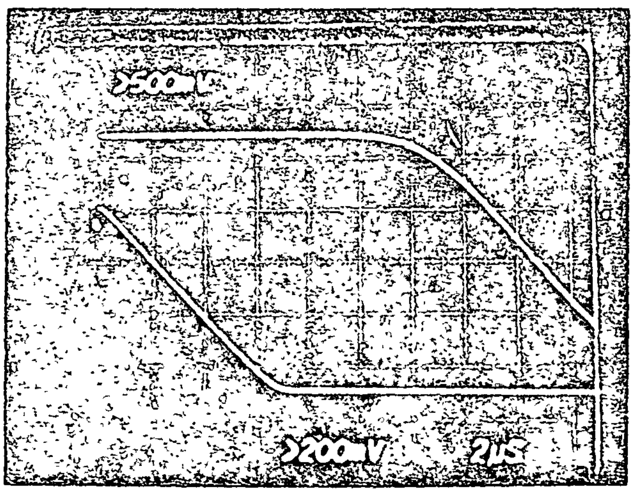
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 9

DELAY TIME
9.2 μSec



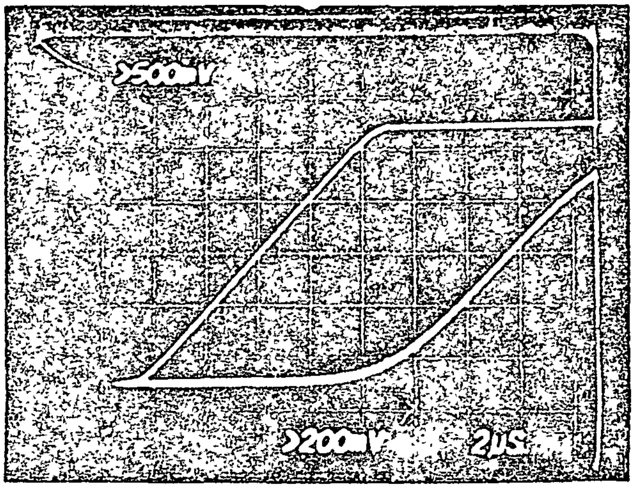
BAND 1
CHANNEL 9

DELAY TIME
14.6 μSec

N.C. DAVISON

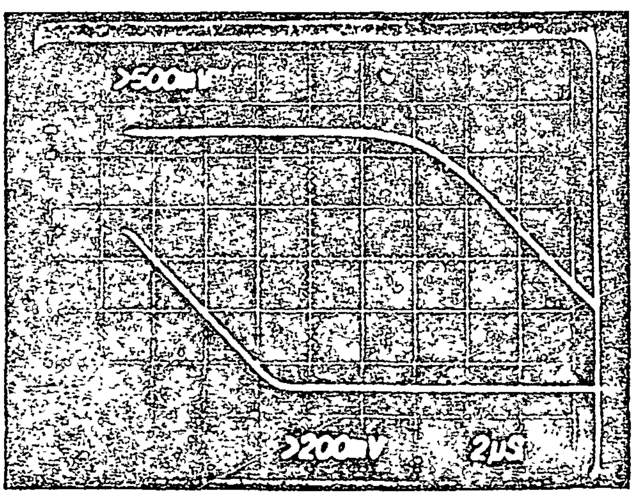
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 10

DELAY TIME
9.6 µSec



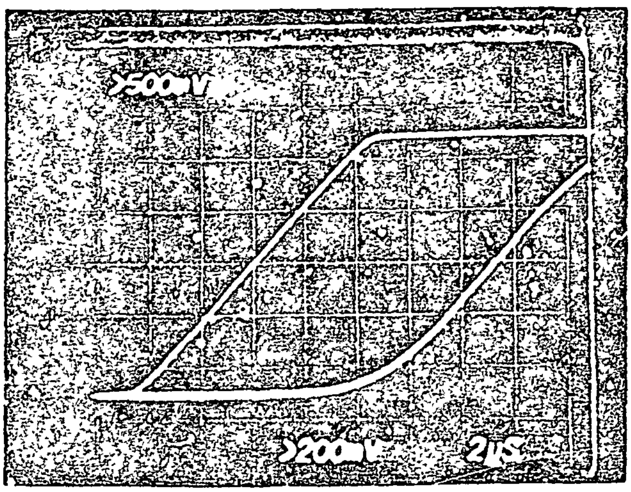
BAND 1
CHANNEL 10

DELAY TIME
15.0 µSec

N.C. DAVISON

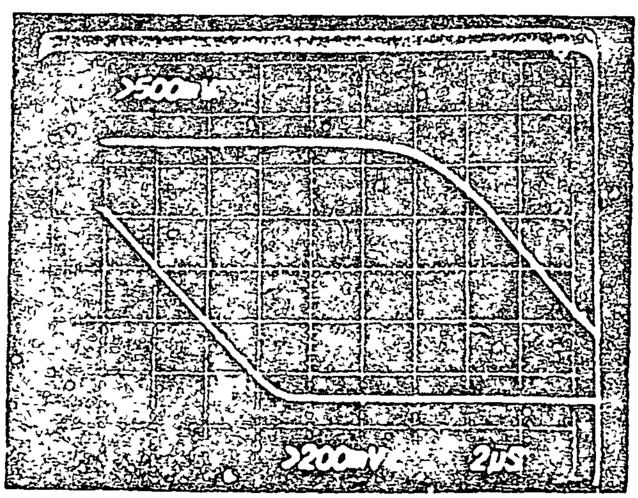
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND I
CHANNEL II

DELAY TIME
9.4 µSec



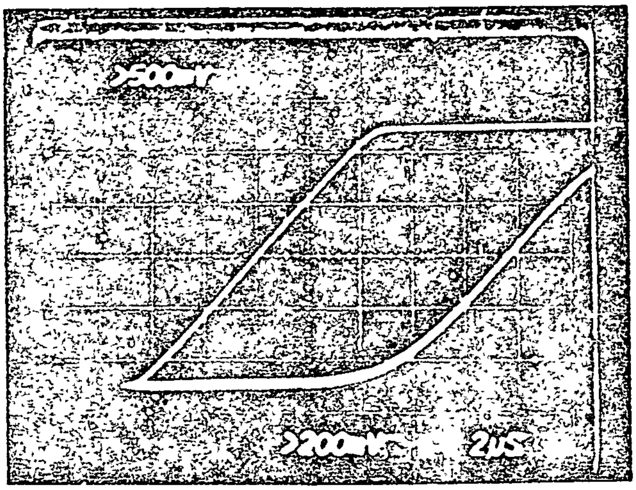
BAND I
CHANNEL II

DELAY TIME
14.6 µSec

N.C. Davison

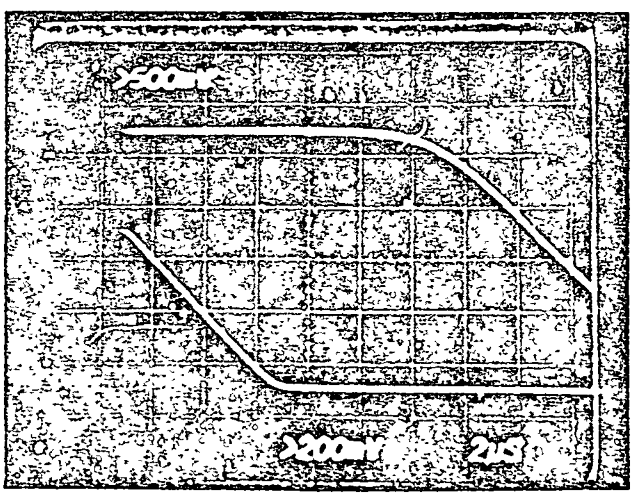
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 12

DELAY TIME
9.6 μSec



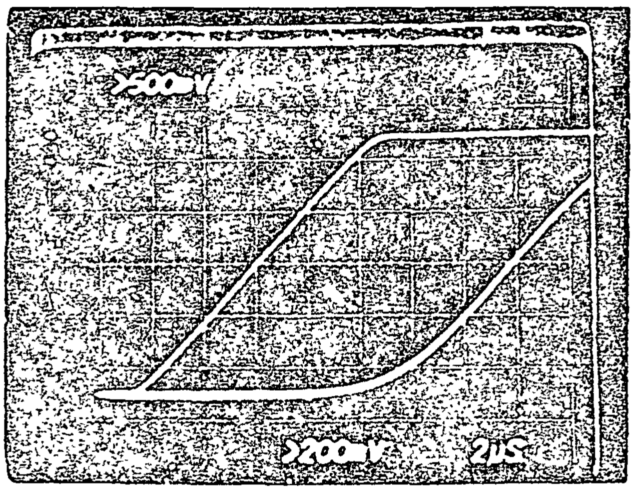
BAND 1
CHANNEL 12

DELAY TIME
15.6 μSec

N. C. Davison

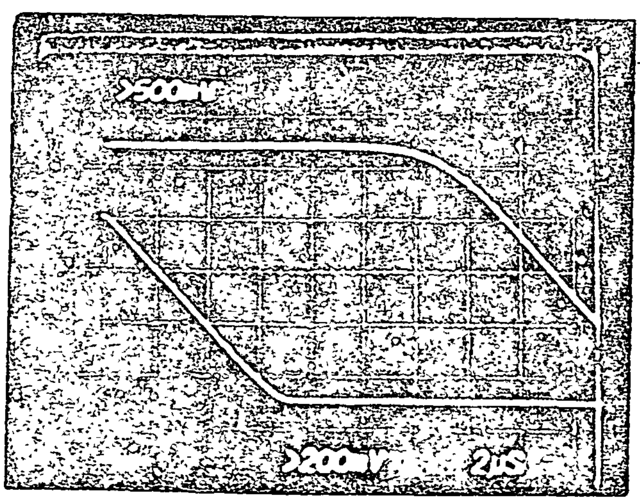
DATE: 11-25-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 13

DELAY TIME
9.8 μSec



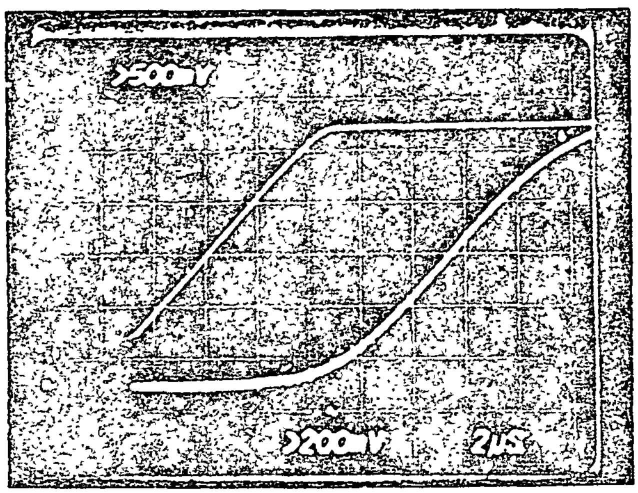
BAND 1
CHANNEL 13

DELAY TIME
15.2 μSec

N.C. DAVISON

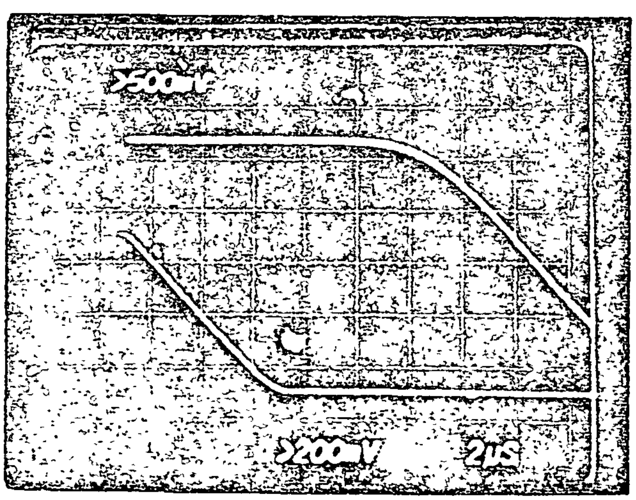
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 14

DELAY TIME
9.4 μSec



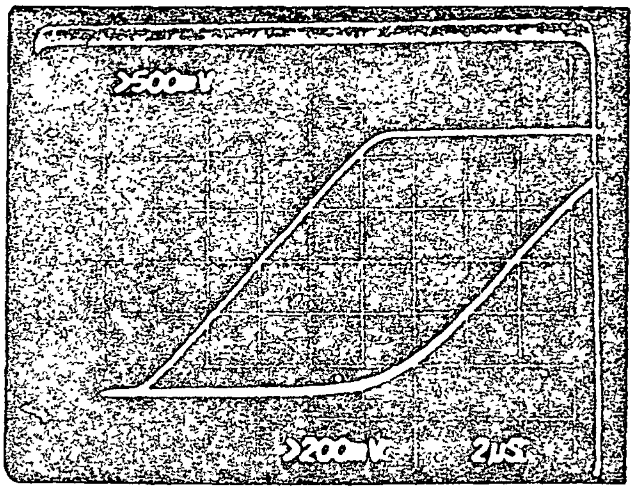
BAND 1
CHANNEL 14

DELAY TIME
14.8 μSec

N.C. DAVISON

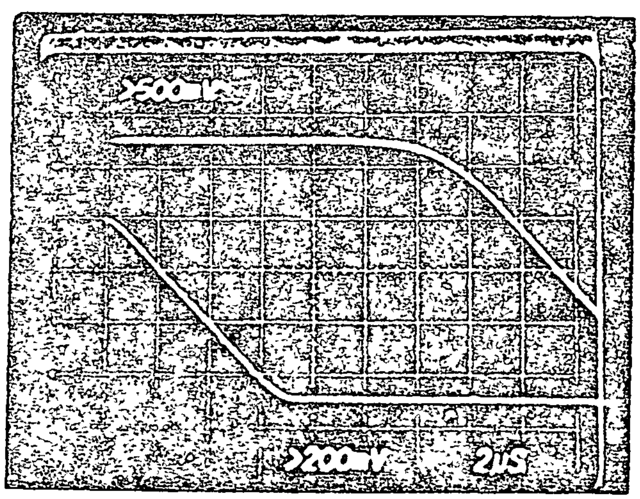
DATE: 11-05-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 15

DELAY TIME
9.8 µSec



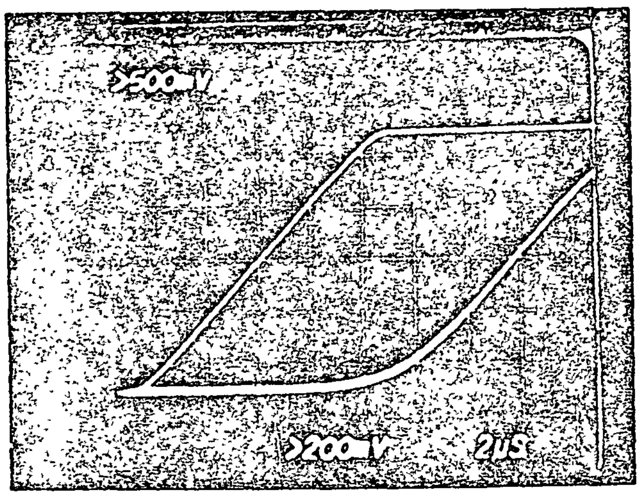
BAND 1
CHANNEL 15

DELAY TIME
15.4 µSec

N.C. Davison

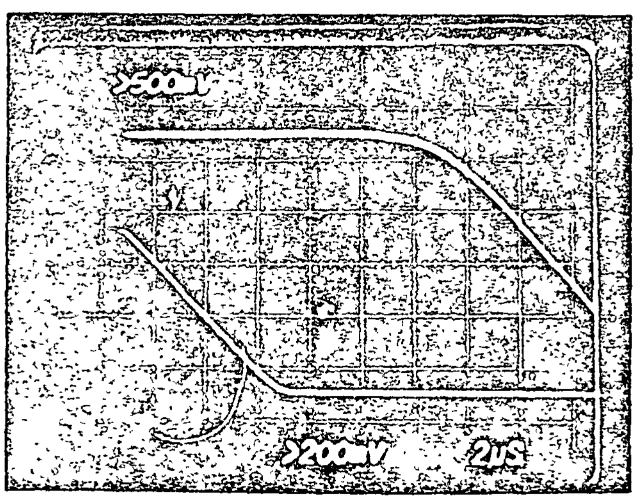
DATE: 11-25-81

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1
CHANNEL 16

DELAY TIME
9.8 μSec



BAND 1
CHANNEL 16

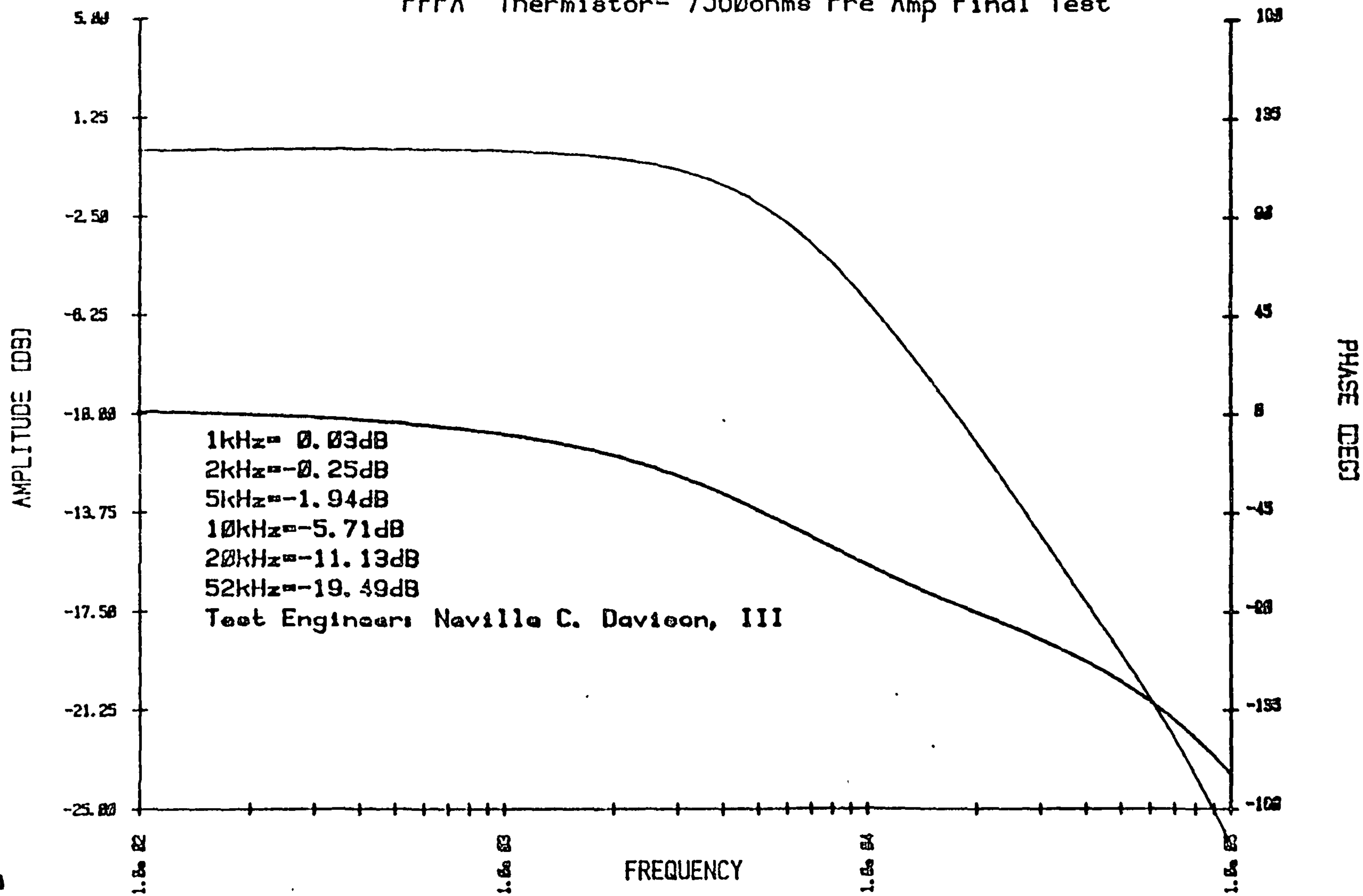
DELAY TIME
~~[illegible]~~ 15.4 μSec

N. C. DAVISON

DATE: 11-05-87

BAND 1 CHANNEL 1 October 29, 1981

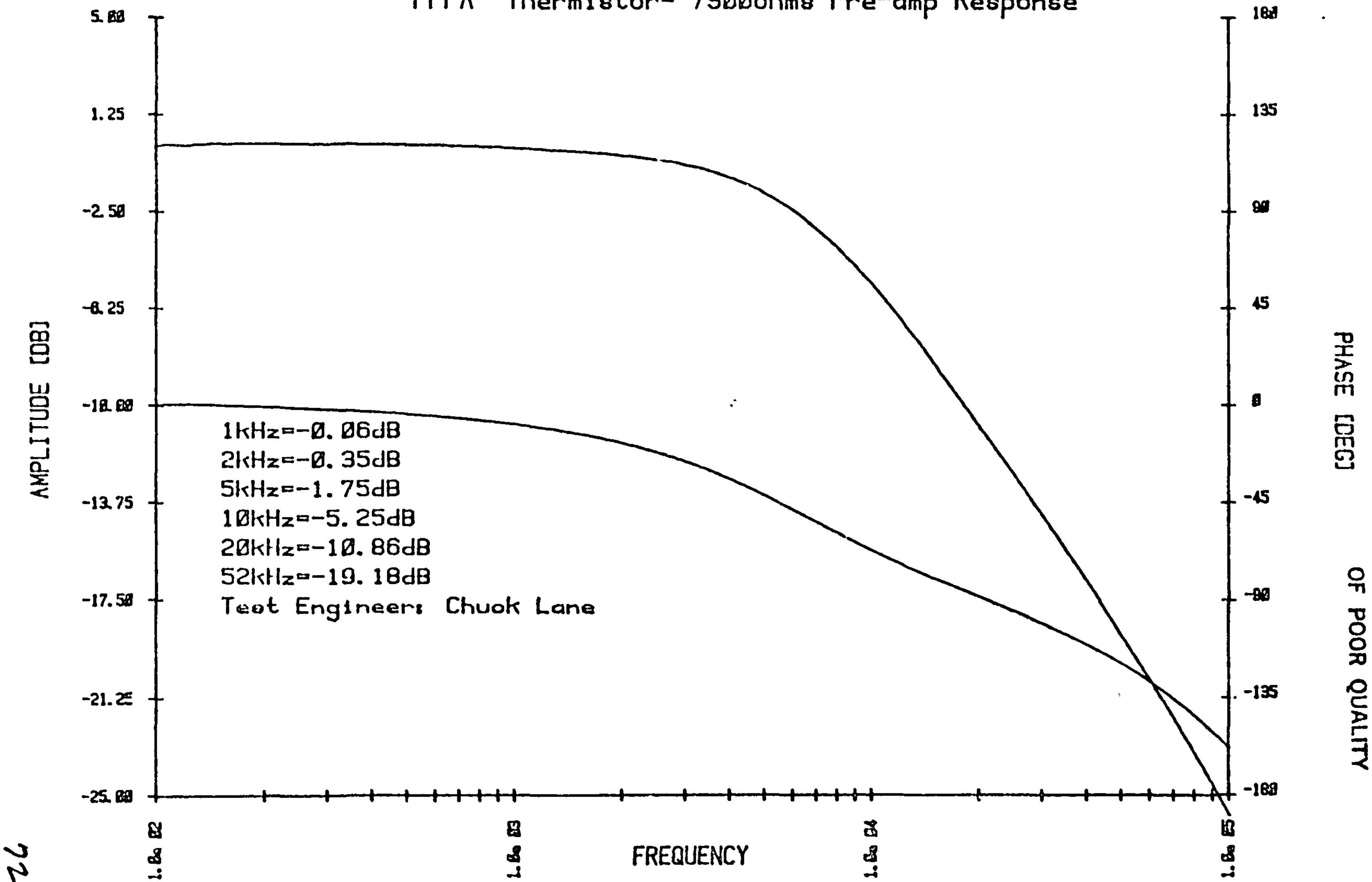
PFPA Thermistor= 7560ohms Pre Amp Final Test



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 1 CHANNEL 2 11/02/81

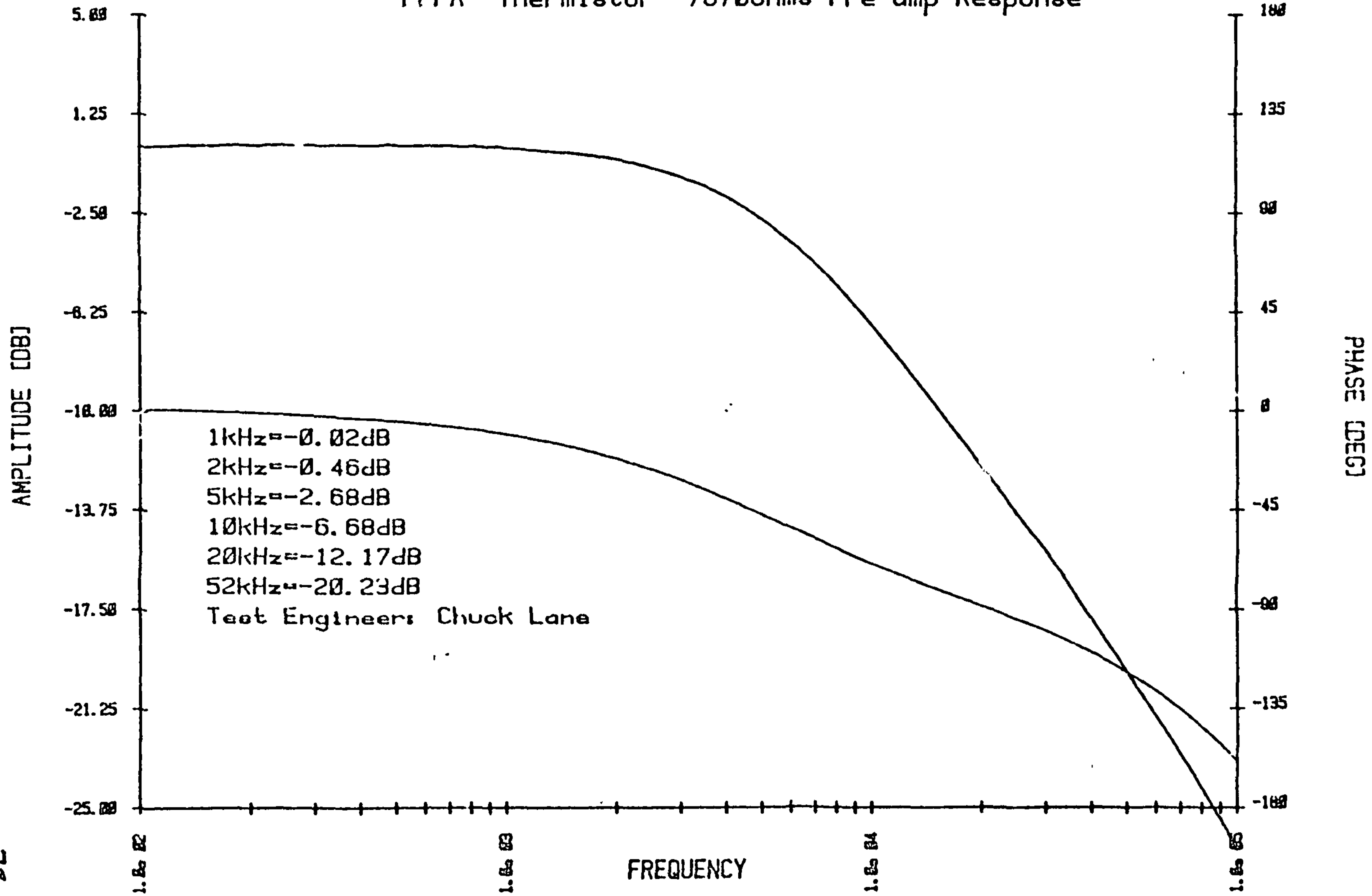
PFPA Thermistor= 7900ohms Pre-amp Response

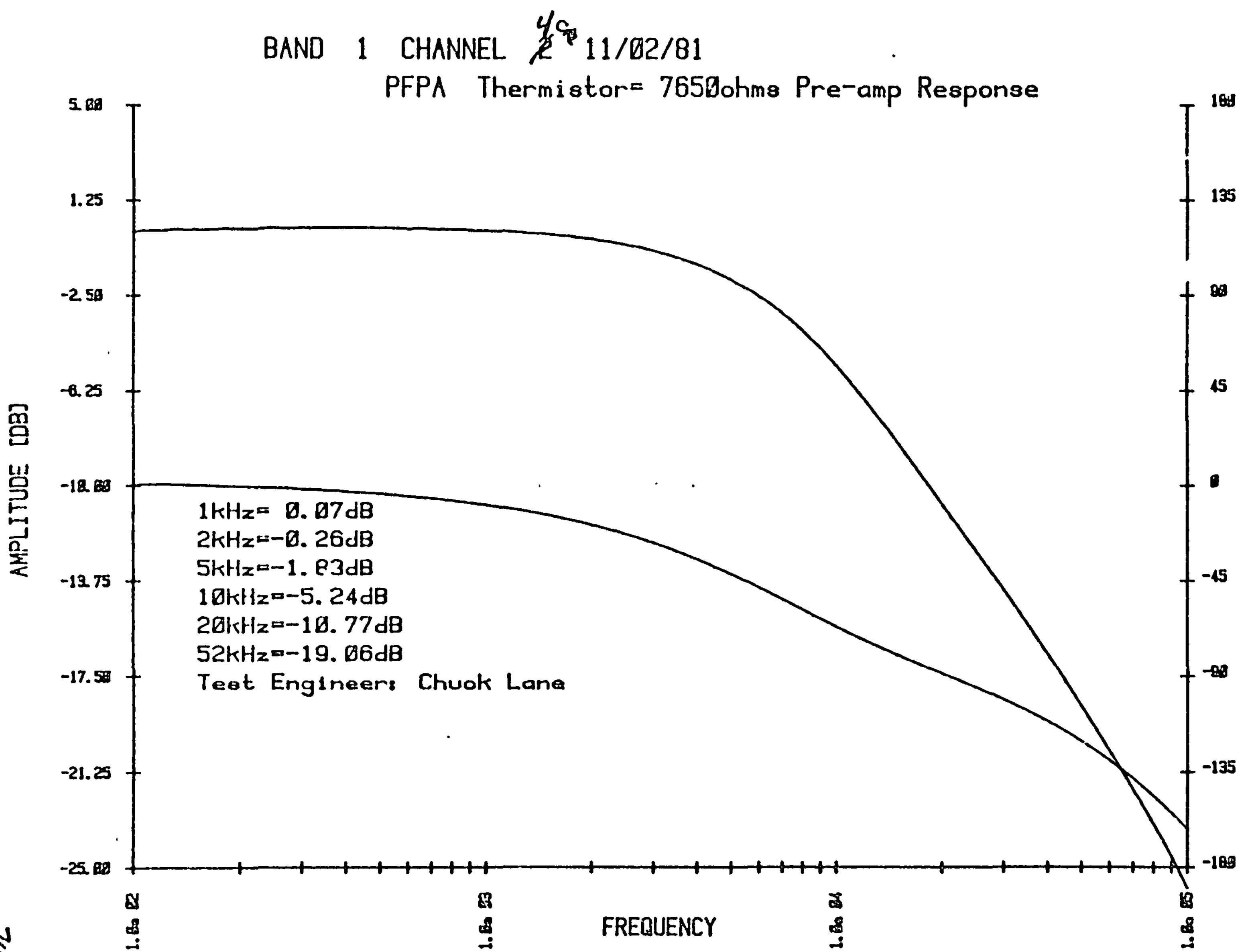


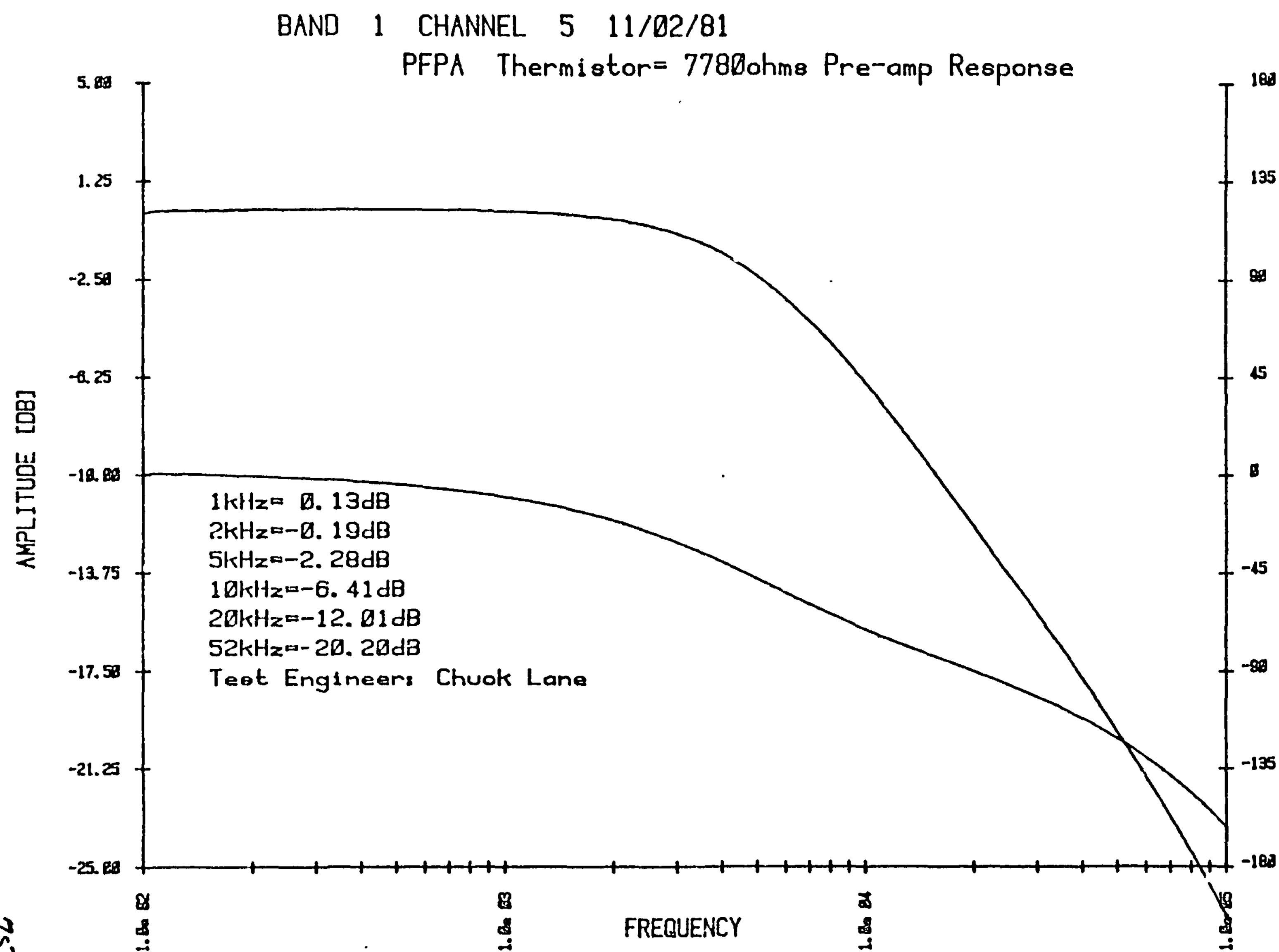
ORIGINAL PAGE IS
OF POOR QUALITY

BAND 1 CHANNEL 3 11/02/81

PFPA Thermistor= 7670ohms Pre-amp Response




BAND 1 CHANNEL 4 11/02/81
PFPA Thermistor= 7650ohms Pre-amp Response
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
1kHz= 0.07dB
2kHz=-0.26dB
5kHz=-1.83dB
10kHz=-5.24dB
20kHz=-10.77dB
52kHz=-19.06dB
Test Engineer: Chuck Lane
1.0e 02
1.0e 03
1.0e 04
1.0e 05
FREQUENCY

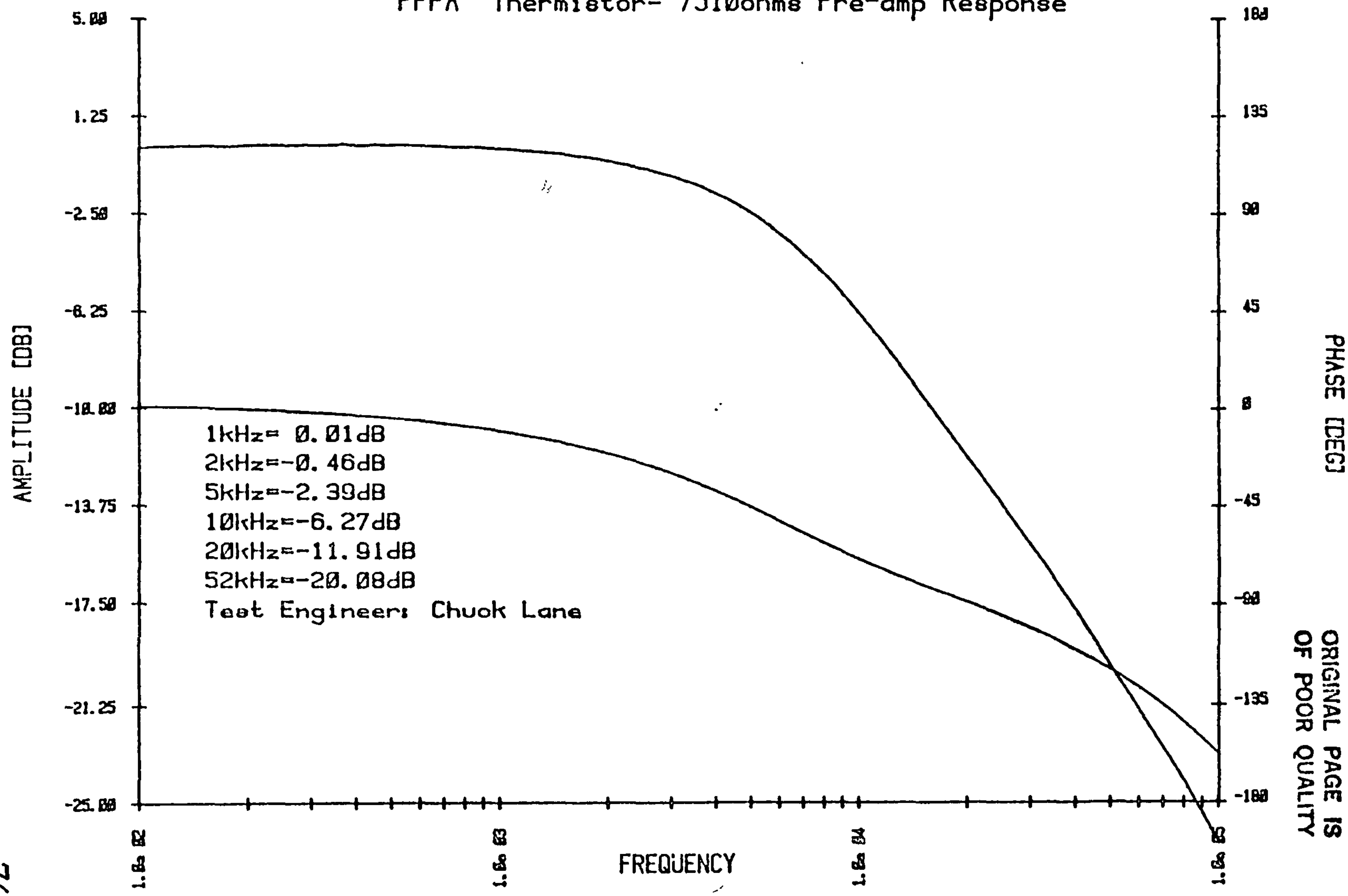


ORIGINAL PAGE IS OF POOR QUALITY

75

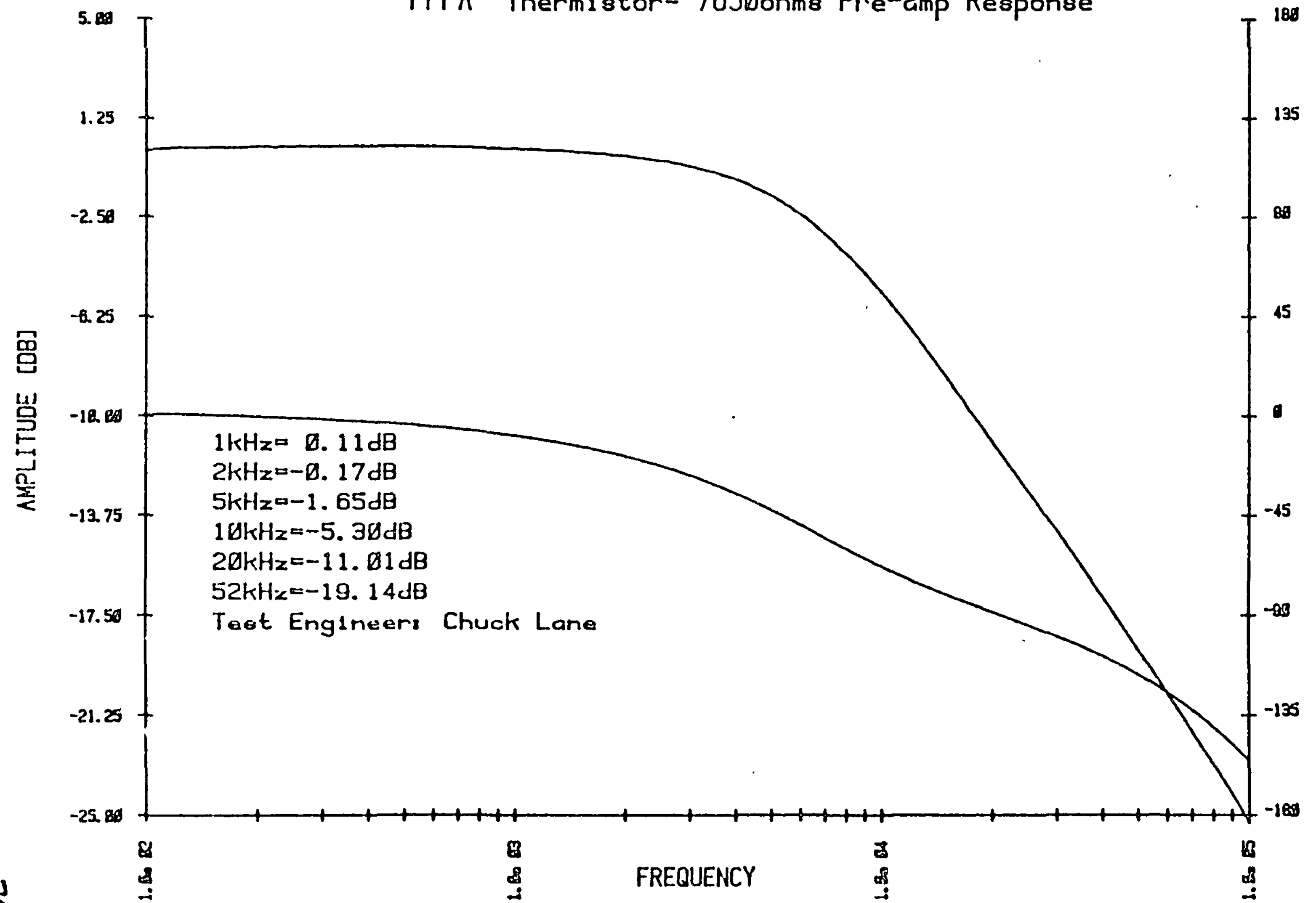
BAND 1 CHANNEL 6 11/Ø2/81

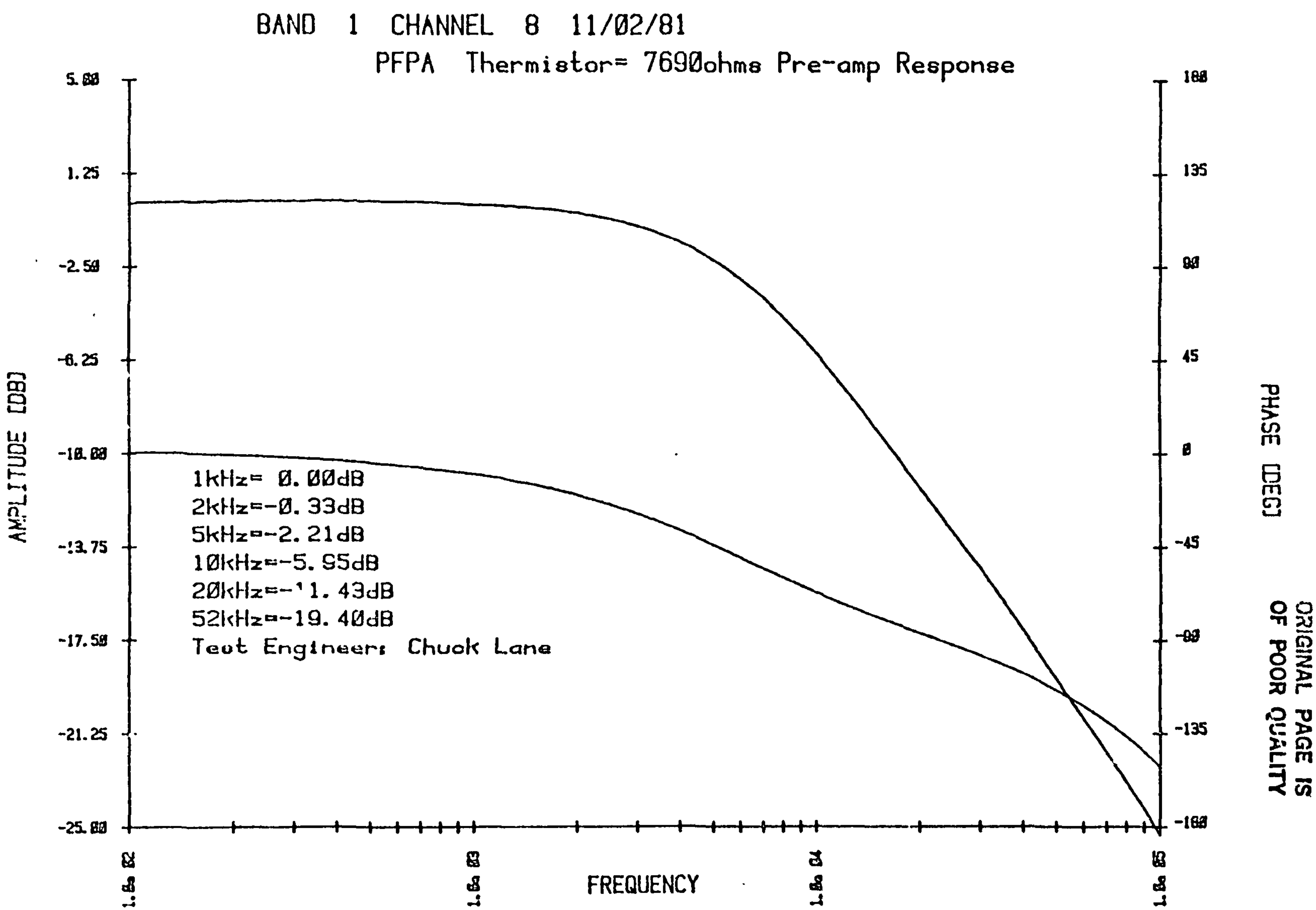
PFPA Thermistor= 751Øohms Pre-amp Response



BAND 1 CHANNEL 7 11/02/81

PFPA Thermistor= 7650ohms Pre-amp Response

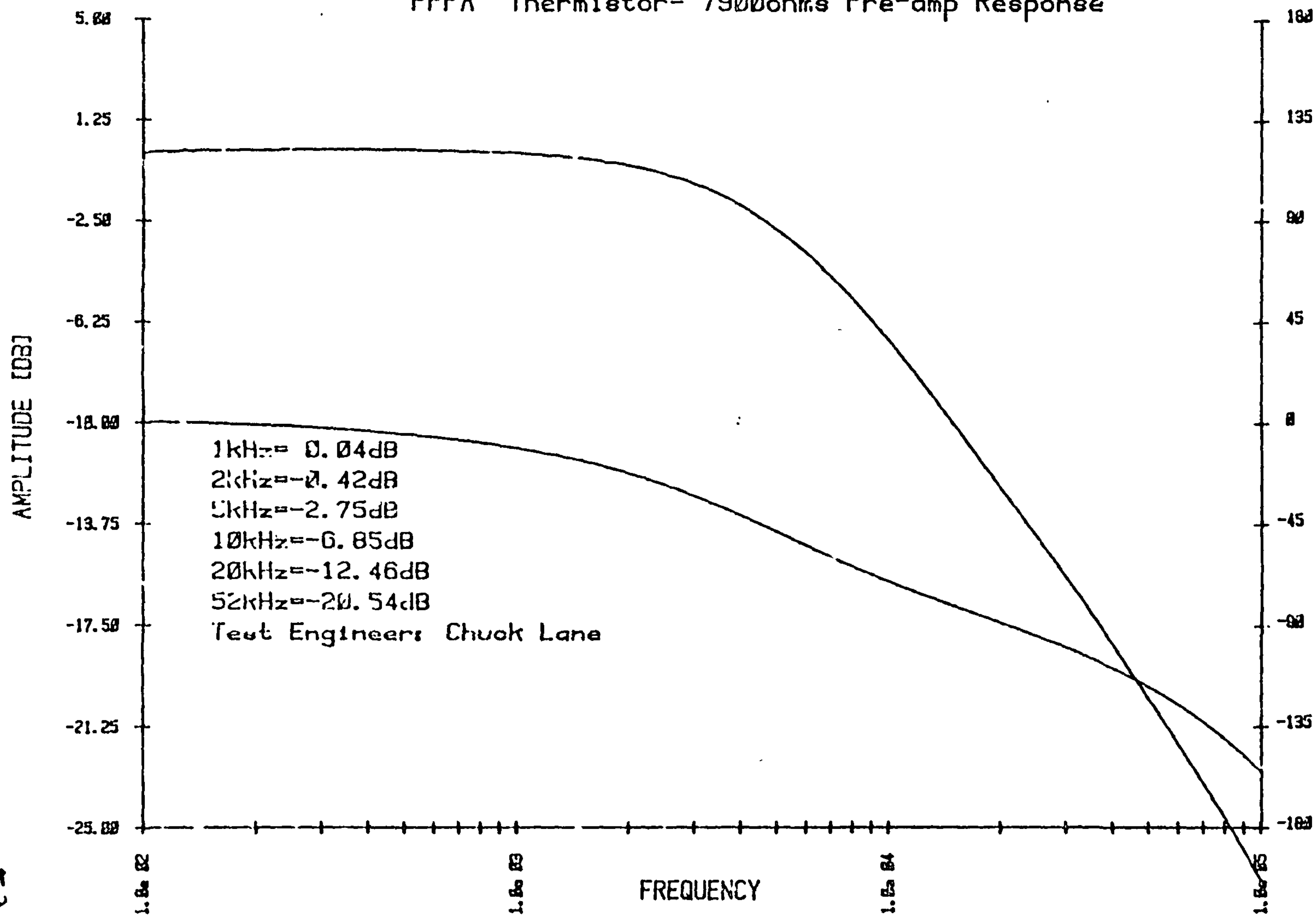


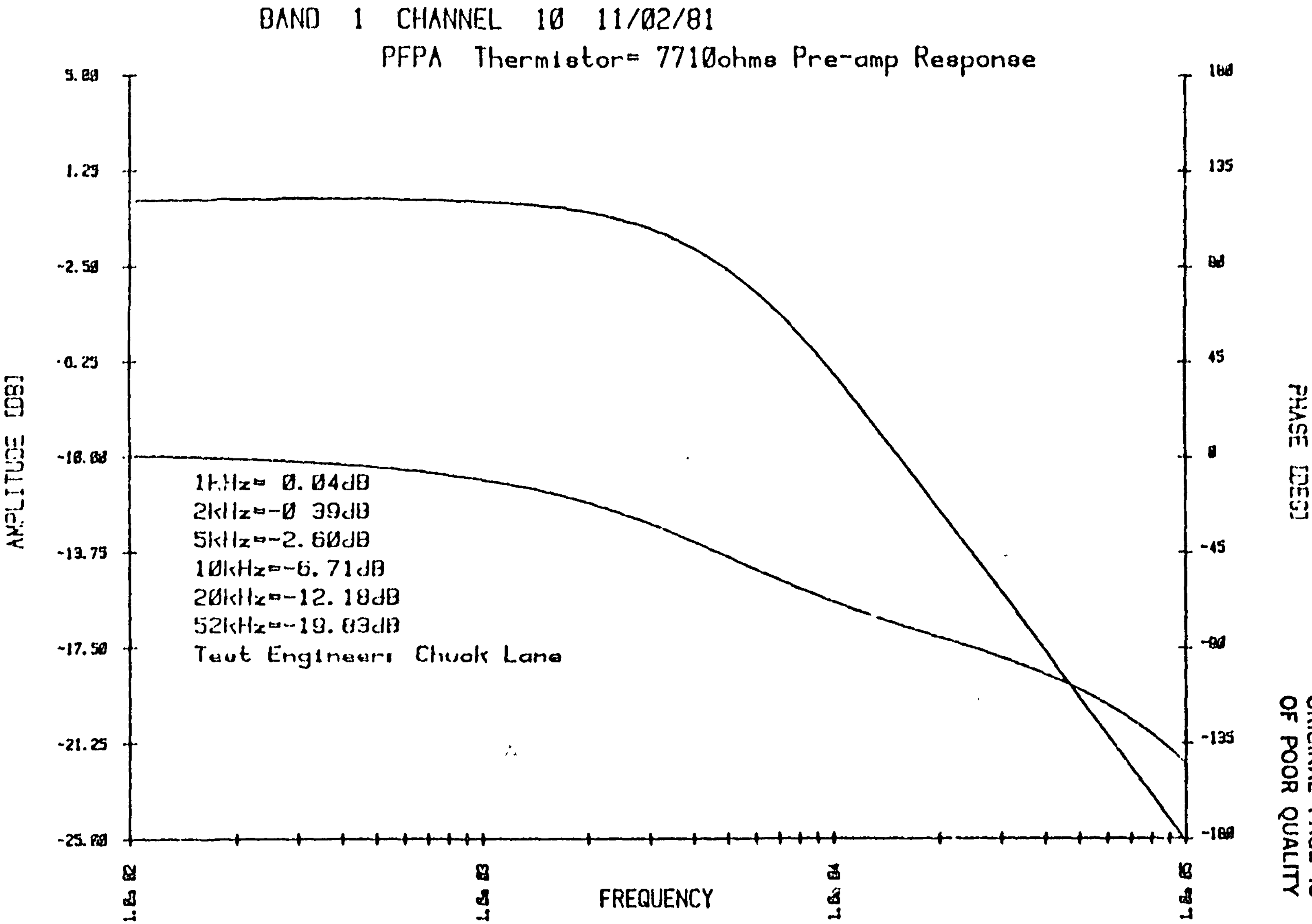


ORIGINAL PAGE IS
OF POOR QUALITY

BAND 1 CHANNEL 9 11/02/81

PFPA Thermistor= 7900ohms Pre-amp Response

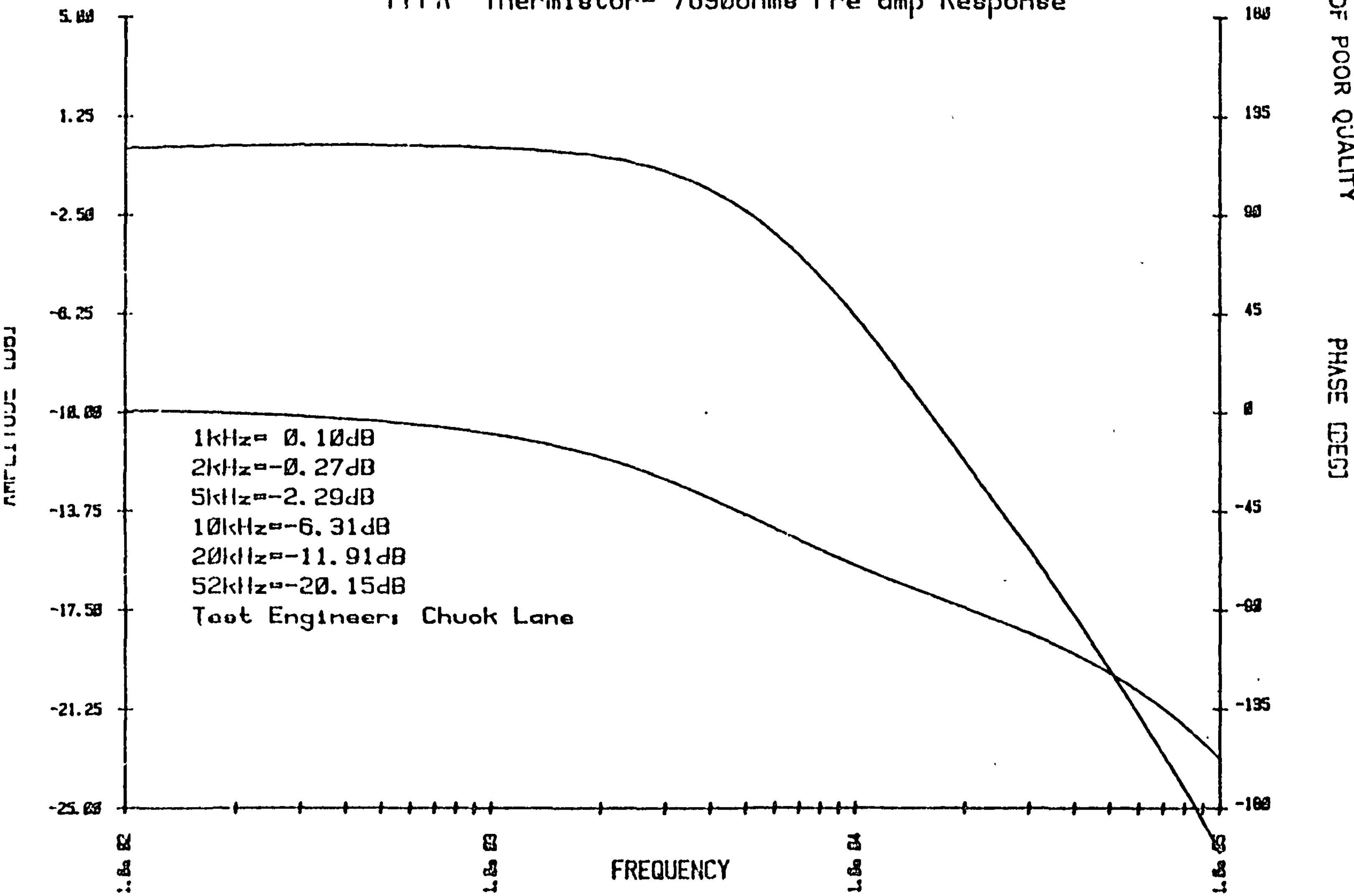




BAND 1 CHANNEL 10 11/02/81
PFPA Thermistor= 7710ohms Pre-amp Response
1kHz= 0.04dB
2kHz=-0 39dB
5kHz=-2.60dB
10kHz=-6.71dB
20kHz=-12.18dB
52kHz=-19.03dB
Test Engineer: Chuck Lane
AMPLITUDE (DB)
PHASE (DEG)
FREQUENCY

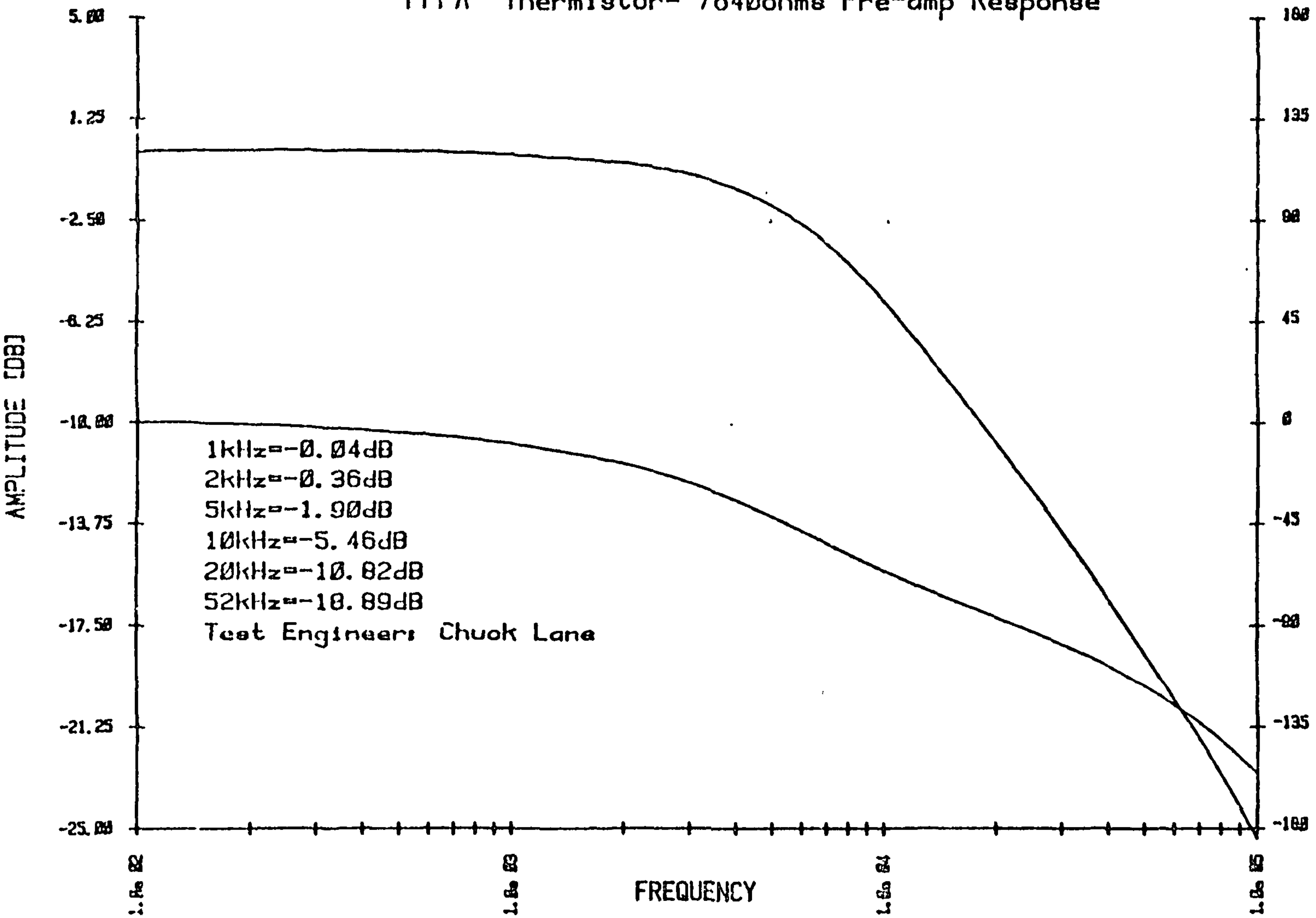
BAND 1 CHANNEL 11 11/02/81

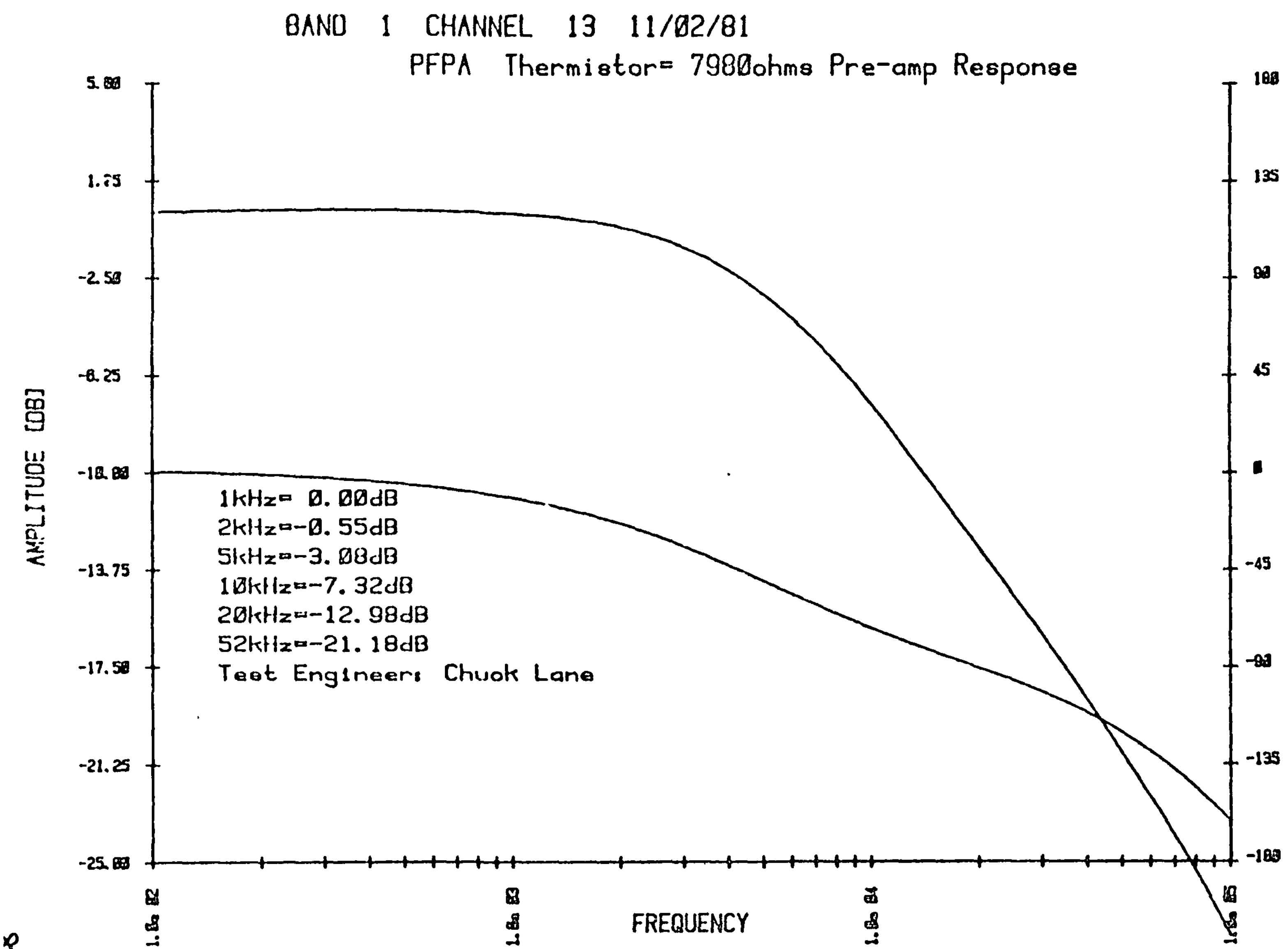
PFPA Thermistor= 7090ohms Pre-amp Response



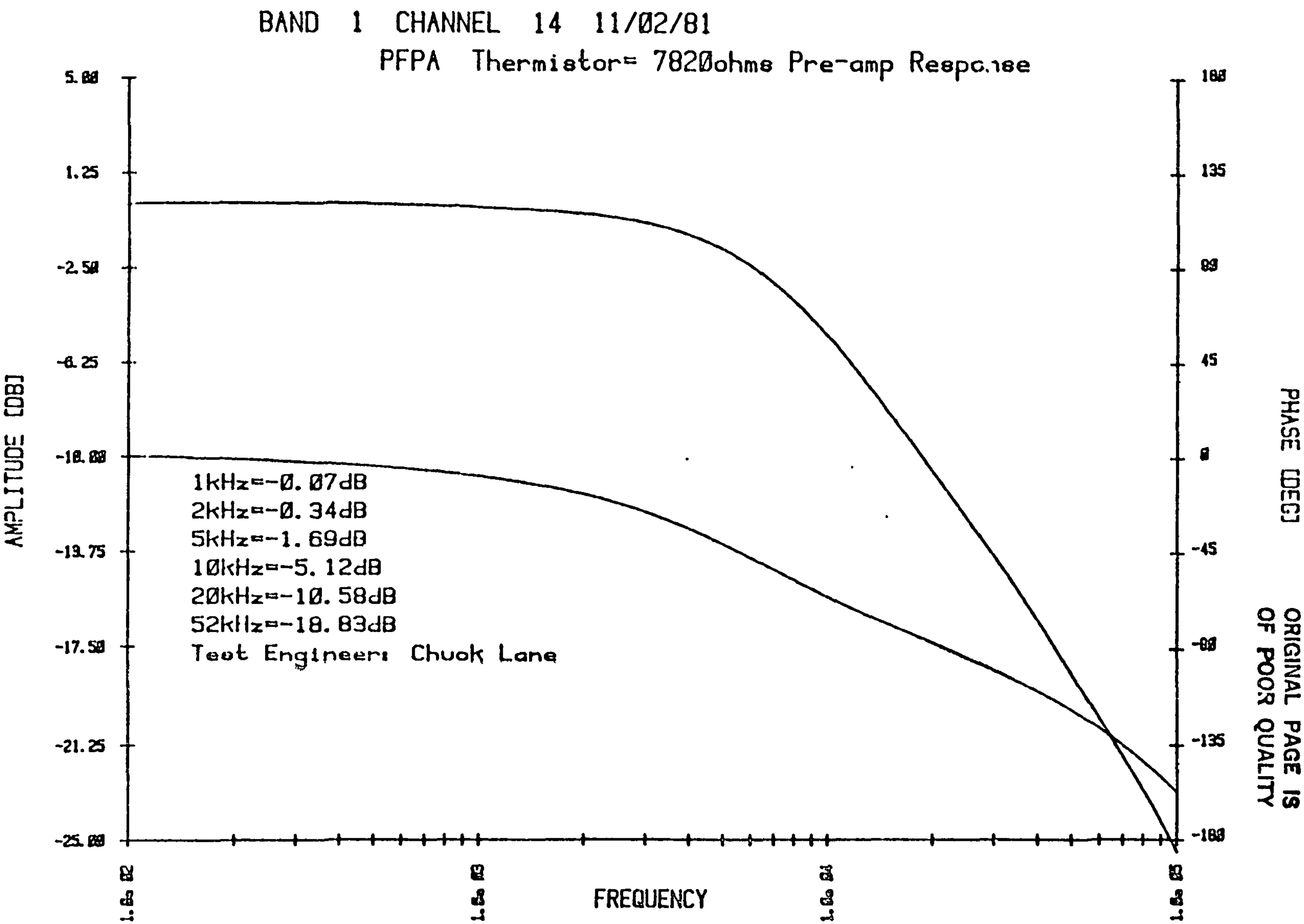
BAND 1 CHANNEL 12 11/02/81

PFPA Thermistor= 7840ohms Pre-amp Response





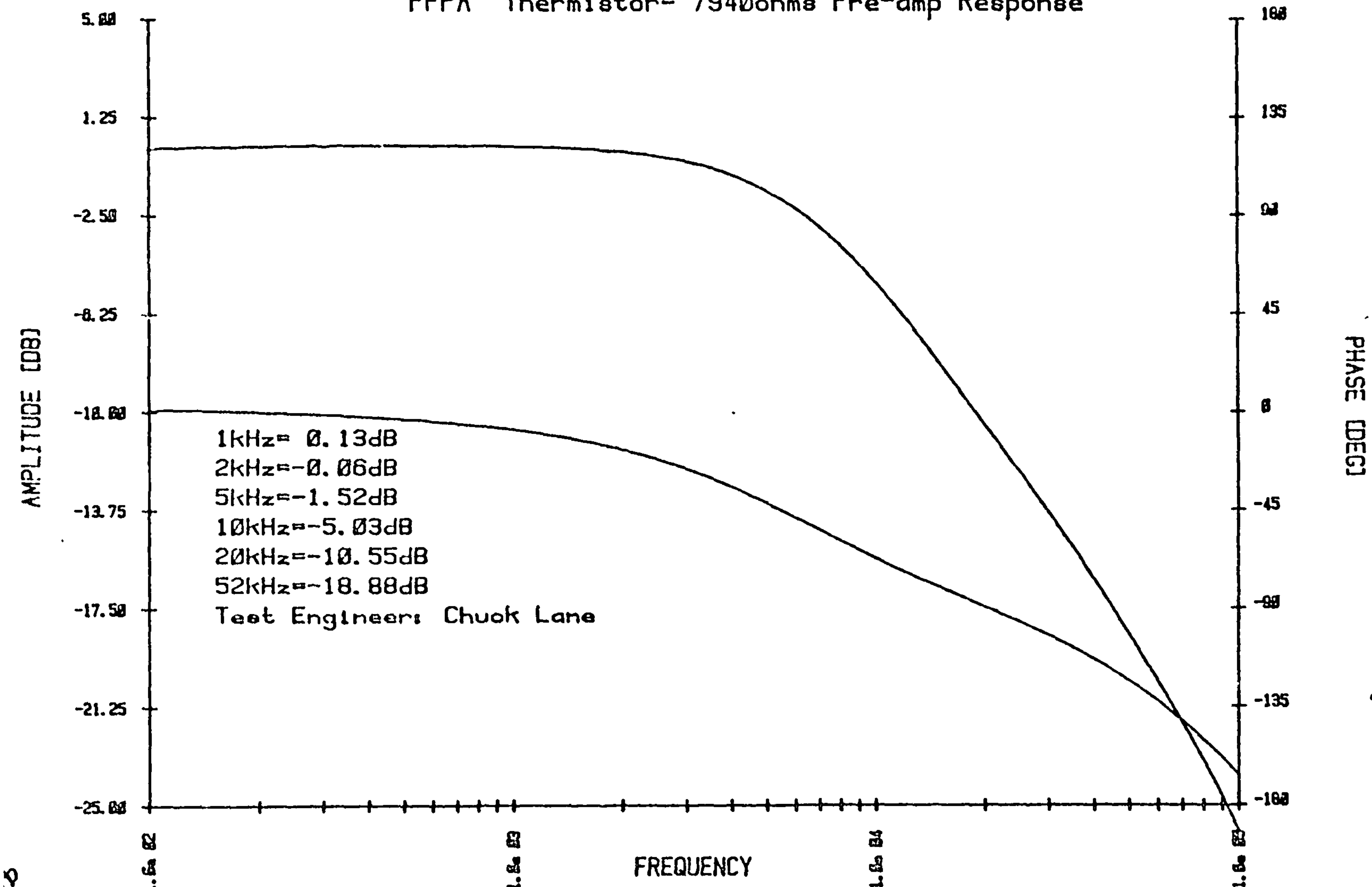
ORIGINAL PAGE IS
OF POOR QUALITY



BAND 1 CHANNEL 14 11/02/81
PFPA Thermistor= 7820ohms Pre-amp Response
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
1kHz=-0.07dB
2kHz=-0.34dB
5kHz=-1.69dB
10kHz=-5.12dB
20kHz=-10.58dB
52kHz=-18.83dB
Test Engineer: Chuck Lane
FREQUENCY

BAND 1 CHANNEL 15 11/02/81

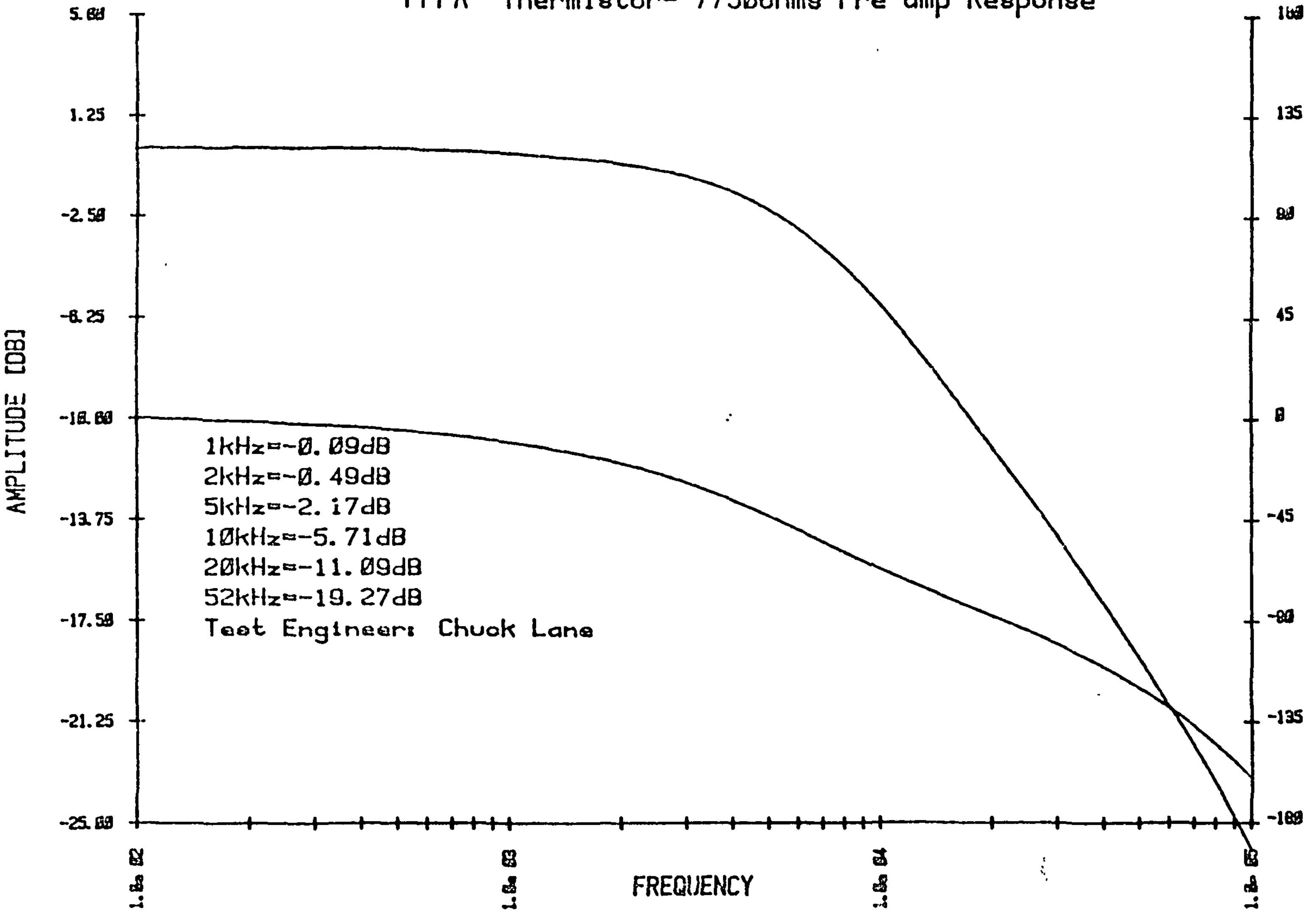
PFPA Thermistor= 7940ohms Pre-amp Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 1 CHANNEL 16 11/02/81

PFPA Thermistor= 7730ohms Pre-amp Response



ORIGINAL PAGE IS
OF POOR QUALITY

TM PFPA

FLIGHT BAND #2

S/N 401

10/5/81

INTRODUCTION

The following pages summarize the data obtained for the Band 2 TM Flight Full Band Assembly (P/N 50797) as of October 5, 1981.

The enclosed data has been collected from half-band, post amplifier, and full-band acceptance test data records. It is presented here to make it available in a single package.

Neville C. Davison, III
FPA Test Supervisor

D.M. Randall
F.P.A. R.E.A.

FPA

SDRC ENGINEERING ORDER/REVISION NOTICE

NO. 3442A

SHEET 1 OF 1

CODE IDENT 11323

DRAWING TITLE TEST PROCEDURE, TM BANDS [illegible] SIGNAL CHANNEL ELECTRONICS	DRAWING NUMBER 16597-4
PROJECT NUMBER V011	ITEM DISPOSITION: REWORK ☐ ITEMS CONFORM ☒ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐
EFFECTIVITY S/N 003 & SUBQ.	CLASS CHANGE: ☐ I ☒ II A — DRAWING TYPE: ☐ A ☒ B
	AUTHORIZING ECR NUMBER TM2427/01

DESCRIPTION OF CHANGE

TOP OF PAGE, TEST DATA RECORD FOR "PREGAIN RESISTOR SELECTION (REF. SECTION 4.5,

WAS: LIMITS

BAND 2: 4.12K TO 11.8K
BAND 3: 2.61K TO 5.90K

IS: LIMITS

BAND 2: 3.01K TO 11.8K
BAND 3: 2.21K TO 12.7K

ORIGINAL PAGE IS
OF POOR QUALITY

* NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION.

PREPARED BY C. DAVISON	DATE 7/16/81	QUALITY APPROVAL [illegible]	DATE [illegible]	RELEASED BY [illegible]	DATE [illegible]
CHECKED BY [illegible]	DATE 7/16/81	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
REA/RSA APPROVAL [illegible]	DATE 7/16/81	PROJECT APPROVAL	DATE	DRAWING REV LETTER	

ORIGINAL PAGE IS
OF POOR QUALITY

REVISIONS

		DESCRIPTION	DATE	APPROVED
	A	INITIALLY RELEASED 8-22-79		
[illegible]5 S/N 001 & UP	B	REPLACES REV A WITH CHANGE AS REQUESTED BY ECR TM1202/01 TO UPDATE TEST PROCEDURE	1-7-80	MJS [illegible]
51065 S/N 001 & UP	C	Incorporated TM1357/01.(1-6) See Revision Notice.	80-2-13	mm [illegible]
[illegible]	D	INCORPORATED TM1423/01 RI AND TM1420/01. SEE REVISION NOTICE.	80-4-21	[illegible]
51065 S/N 002 & SUBQ	E	Incorporated E.O. 9965 and E. O. 1684A.	80-11-19	BJM [illegible]
51065 S/N 003 & SUBQ	F	Incorporated E.O. 2068A.	80-11-19	BJM [illegible]
51065 SN 002 & SUBQ	G	INCORPORATED TM2220/01.(1) ADDED TO PARA 4.9. INCORPORATED EO'S 2972A & 2978A.	81-3-31	[illegible] NCJ
51065 S/N 003 & SUBQ	H	Incorporated E.O. 2769A	81-5-14	NCJ [illegible]

BAND 2 FINAL TEST MAIN AHR No. 50904-2 - Post Amp

10-05-81 OPER. No. 1300 No. 50797 - Pre Amp

OPER NO 2300

FINAL TEST

MANY CHANNELS HAVE MINOR OUT OF SPEC. CONDITIONS RE. T.R., F.R. & XTALK.
NOISE FOR ALL CHANNELS IS EXCELLENT.

[signature] OCT. 5, 1981

REVISION STATUS THIS PRINT NOT MAINTAINED AFTER JUL 16 1981
DO NOT USE THIS PRINT
UNLESS YOUR ORDER OR INSTRUCTIONS SPECIFY THE REVISION [illegible]

CONTRACT NO	NAS 5-24200
[signature]	1-2-80
[signature]	1-2-80
[signature]	1-3-80
[signature]	1-7-80

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company
GOLETA, CALIFORNIA

TITLE
TEST PROCEDURE, TM BANDS 1-4
SIGNAL CHANNEL ELECTRONICS

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

SCALE | SHEET 1 OF 20

PL 1162

ORIGINAL PAGE IS
OF POOR QUALITY

1.0 SCOPE

This document describes the functional test of the Silicon Detector and Preamplifier Assembly, 50797, and the Post-amplifier Circuit Board for Bands 1-4, 50904. Together these make up 16 complete channels, or one spectral band, of TM signal electronics. In preparation for the test, the 50797 assembly is mounted in the 75729 bonding and test fixture. A modulated LED is focussed on each individual detector. The postamp boost and rolloff resistors are set for each channel to provide proper frequency response from 100 Hz to 52 kHz and transient response to a 10 μs ramp. Wideband noise is measured for each channel. Crosstalk is measured from each channel to all other channels at 50 kHz. Once a preamp and postamp assembly are tested together, it is intended that they be installed in the same band location in the TM instrument.

2.0 APPLICABLE DOCUMENTS

2.1 SBRC Documents

The following documents specify the electrical assembly design and are for use in identifying details necessary in testing.

Drawings

50797	Silicon Detector & Preamplifier Assembly
50805	Electronic Diagram, Silicon Detectors & Preamplifiers
50904	PWB Assembly, Postamplifier, Band 1-4
52732	Parts, Electronics Select, TM
50905	Elec. Diagram, Postamplifier, Band 1-4
75918	Detector Array Alignment Fixture Assembly
76600	Full Band Test Set
76601	Voltage to Current Converter
76602	Optical Fiber

3.0 TEST EQUIPMENT REQUIRED (OR EQUIVALENT)

ORIGINAL PAGE IS OF POOR QUALITY

3.1 Full Band Test Set, SBRC Drawing 76600

The test set contains connectors to mate with the Detector and Preamplifier Assembly, a connector to accept the post-amplifier circuit board, a selector switch to monitor preamp and postamp outputs and potentiometers for adjusting the boost and rolloff resistance.

3.2 Oscilloscope

Tektronix type 547 oscilloscope with a 1 A7A plug-in, or equivalent.

3.4 Wave Analyzer

Hewlett Packard 3591A selective voltmeter, or equivalent, is used to measure crosstalk.

3.5 True RMS Voltmeter

Hewlett Packard 3400A, or equivalent, to measure frequency response and wideband noise.

3.6 Detector Array Alignment Fixture Assembly, SBRC Dwg. 75918

This assembly contains a microscope with a photometric eye-piece which allows the light from an optical fiber to be focussed onto an individual detector element.

3.7 Optical Fiber, SBRC Dwg. 76602

An optical fiber about 2 feet long is used between the light emitting diode (LED) and the alignment fixture assembly so the LED drive signal current will not be picked up by the high impedance focal plane circuitry.

3.8 Light Emitting Diode

Laser Diode Laboratories, type 639AS3831.

3.9 Voltage-to-Current Converter, SBRC Dwg. 76601

This box drives the LED with a current proportional to its voltage input.

3.10 Function Generator

Wavetek type 147 drives the voltage-to-current converter for the frequency response and crosstalk tests.

3.11 Pulse Generator

Data pulse type 116 drives the voltage to current converter for the transient response test.

3.12 Integrator/Averager

PAR type 162 is used to improve the signal to noise ratio during the transient response test. The model 164 gated integrator plug-in is used.

3.13 Plotter

Hewlett Packard type 7044A is used with the Integrator/Averager.

3.14 Automatic Equipment

The following equipment is used when testing is performed in other than the manual mode.

3.14.1 Network Analyzer - The HP 3042 Network Analyzer consists of a 3308B Synthesizer, 3570A Network Analyzer and a 9825S Desk Top Computer.

4.0 PROCEDURE

4.1 Inspection

Check to see that nominal component values have been installed on the postamp board at C33-48, R1-16, R17-32, R33-48, R65-80 and R81-96. The nominal values are shown on the postamp assembly drawing 50904 as a function of the intended band number (1-4). The assembly drawing also gives a 52732 Select List Dash Number for each select component also as a function of intended spectral band. The final selected value must be chosen from the values in the list.

4.2 Setup

Attach the 50797 Detector Preamplifier Assembly (mounted in the bonding and test fixture) to the baseplate of the Detector Array Alignment fixture. Focus the microscope on detector element number 1 of 16. Connect the sinewave generator, voltage-to-current converter, LED and optical fiber. Locate the LED as far as possible from the detector-preamp assembly. Insert the postamp board into the test set socket.

4.3 Supply Current

Apply $\pm 21V \pm 0.5V$ to the test set following the indicated polarity. Limit the currents to 200 mA. Turn on the supply and record the currents as indicated on the supply meters.

4.4 Offset Adjustment

Connect the test set postamplifier high and low outputs to the + and - inputs of the oscilloscope preamplifier. Adjust the nominal 20 KΩ offset resistor in each channel to produce a differential offset voltage, $V_{OH} - V_{OL}$, of $0 \pm 1V$. Record the offset voltage and resistor value. The focal plane assembly must be dark for this test.

4.5 Low Frequency Gain Adjustment

Connect the true-reading rms voltmeter to the oscilloscope preamplifier output. Adjust the sinewave generator to produce a $4 v \pm 1 v$ pk-pk 100 Hz undistorted sinewave on the scope. In each band select the channel whose feedback resistor is closest to the nominal value ($1.0 X 10^7$ ohms). Adjust the pre-gain resistors on the postamp board so that the gain value for each of the other channels matches that of the selected channel $\pm$ 5%. Resistors are to be replaced at the conclusion of this test. Record the final resistor values.

NOTE: When testing Band 4 only, postamp board resistors R33 through R48 (Post-gain resistors) must be lifted from the circuit board at one end. Otherwise a 4V pk-pk signal will not be attainable. Resistors are to remain lifted throughout the remainder of this test.

4.6 Frequency and Transient Response Adjustment

Measure the response to a 10 us ramp using the pulse generator, voltage-to-current converter, light emitting diode, optical fiber and microscope. Adjust the boost control on the test box for flattest response in the 30 to 500 us region after the ramp. Now reconnect the function generator and set the rolloff control on the test box for -3.0 db at 52 kHz. These controls are interactive so several iterations may be required.

The final setting should result in the transient response reaching final value within 1% after 60μS and within 1.5% after 35uS. Record the maximum overshoot (limit = 10%) and the 2 to 98% risetime (limit = 20μS). The frequency response should be -(3 -0/0-0.5) dB at 52 kHz. Record the boosted frequency response on the data sheet for the boost and rolloff settings obtained. Plot the transient response using the Integrator/Averager and the plotter.

It may be necessary to add capacitance at C33-C48 to meet the requirement. If capacitance is added, record the values on the data sheet. If no capacitor is required, enter 0 for value and make note that capacitor was not needed.

4.7 Wideband Noise

With the boost and rolloff set as in paragraph 4.6, measure the wideband noise on the true rms meter. It shall be less than (2.4 pA) (Rf) where Rf is the feedback resistor value in the channel being tested. Record the noise on the data sheet.

4.8 Crosstalk - Using the wave analyzer at the 1L7A signal output and the sinewave light source driver with the voltage-to-current converter, measure the crosstalk from each channel to its four nearest neighbors at 50 kHz. (Channel 1 has only 2 nearest neighbors: 2 and 3. Channel 2 has 3: 1, 3 and 4. Channel 3 has 4: 1, 2, 4, and 5. Also record the average crosstalk from each channel to its 11 non-neighbors. The measured crosstalk shall be less than 1% (-40 dB) for nearest neighbors and less than 0.1% (-60 dB) for non-neighbors.

4.9 Ground Continuity and Isolation

Turn off power. Remove connectors. Measure <[illegible] ohms between J1-16 and:

J1-27	J2-6
J1-23	J2-10
J1-1	J2-31
~~J1-6~~ J1-5	J2-27

Record maximum reading of Data Sheet.

Measure >1 MΩ between J1-16 and

J1-18	J2-15
J1-11	J2-21

Check Data Sheet O.K.

Measure >1 MΩ between J1-16 and the FPA aluminum mounting fixture.

Check Data Sheet O.K.

Measure <25Ω between J1-16 of odd channels and J1-16 of even channels for Bancs 1, 2, 3 and 4. Check data sheet O.K.

4.10 Time Delay

Measure the Time Dealy between the 50% points of the led drive current waveform transition and the corresponding channel output waveform transition. Display both waveforms on the oscilloscope, using a dual trace plug-in with external sync and 2µS/CM sweep time. Photograph the rise and fall separetely for each channel. Record the delays on the Data Sheet. They shall be TBD $\pm$0.5µS.

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS OF POOR QUALITY

5.0 QUALITY ASSURANCE PROVISIONS

5.1 Notification of QA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by QA Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All Flight Assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

5.4 Failures

Problems/failures encountered during testing of flight hardware shall be handled in accordance with Thematic Mapper Product Effectiveness Plan HS236-0066A.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer, QA Engineer, and Design Engineer. When the QA Engineer has not witnessed the test, he should sign the data sheet after it is reviewed by the Design Engineer. A typical data sheet format is included at the end of this procedure.

6.2 Distribution of Test Records

After the test data sheet is signed, place one (1) copy in the traveling file, one(1)copy and the original in the Engineering file, and give one (1) copy to QA.

TEST DATA RECORD

ORIGINAL PAGE IS
OF POOR QUALITY

Detector Preamplifier Assembly 50797, S/N 401
contains 51015 assemblies S/N 103 and 207-1,
odd and even channels, respectively.

Postamplifier Circuit Board Assembly 50904, S/N 201
Intended for TM Spectral Band 2.
Feedback Resistor values from data sheets for specification 16306.

	ODD		Even
1	.84	2	.87
3	.96	4	.95
5	.95	6	1.10
7	.94	8	1.15
9	1.00	10	.97
11	1.15	12	1.00
13	.84	14	1.00
15	.88	16	.85

4.3 Power Supply Current
Limit 200mA
+ 21V 175 mA
- 21V 175 mA

Test Engineer C. R. Lane Date 10-05-81

Test Supervisor [illegible] C. Denison III Date 10-5-81

Quality Control Stamp VERIFY DATA COMPLETE Date 10/12/81

PD Ryan

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

SCALE	REV	SHEET
	—	9

ORIGINAL PAGE IS
OF POOR QUALITY

4.4

Channel	Resistor	Value	908600-( )	Measured Offset Voltage	Limit: 0.0 ± 1.0 V
1	R17	20.5k	-252	-1.5 V	*
2	R25	20.0k	-251	+150 mV	
3	R18	18.2K	-247	-100 mV	
4	R26	18.2K	-247	-50 mV	
5	R19	21.5K	-254	+1 V	
6	R27	18.7K	-248	+75 mV	
7	R20	21.0K	-253	+1.5 V	*
8	R28	18.7K	-248	-1.5V	*
9	R21	21.5k	-254	-300 mV	
10	R29	19.6k	-250	+500 mV	
11	R22	21.0K	-253	-800 mV	
12	R30	19.6k	-250	-325 mV	
13	R23	20.5k	-252	-250 mV	
14	R31	20.0k	-251	+1 V	
15	R24	18.2K	-247	-700 mV	
16	R32	20.5k	-252	-400 mV	

Test Engineer C. R. Lane Date 10-01-81

Test Supervisor Bill Clinson Date 11-5-81

Quality Control Stamp PB Ryan Date 10/12/81

* CH 1, 7, 8 OUT OF SPEC
REF FR* 8329

SIZE	CODE IDENT NO	NUMBER
A	11323	16557
SCALE	REV 4	SHEET 10

4.5 Pregain Resistors

LIMITS:

Band 1: 4.87K to 16.2K
~~2: 4.12K to 11.8K~~ 1K to 11.8K per ED 3442A
3: 2.61K to 5.90K
4: 8.25K to 10CK

ORIGINAL PAGE IS OF POOR QUALITY

Channel	Resistor Value	908600-( )
1	R81 4.42K	-188
2	R89 ~~5.62K~~ 4.64K	-190
3	R82 5.62K	-198
4	R90 5.23K	-195
5	R83 5.62K	-198
6	R91 7.15K	-208
7	R84 5.36K	-196
8	R92 7.50K	-210
9	R85 6.34K	-203
10	R93 5.36K	-196
11	R86 7.87K	-212
12	R94 5.76K	-199
13	R87 3.83K	-182
14	R95 6.19K	-202
15	R88 4.42K	-188
16	R96 4.32K	-187

Test Engineer C. R. Lane Date 10-01-81

Test Supervisor Neville C. Davison Date 10-5-81

Quality Control Stamp I 118 ACCEPT P.G. Ryan Date 10/12/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 11

4.6 Transient Response

Maximum excursion from final value after time $t_0 + t$ where t_0 is the time when the response reaches 2% of final value.

	t_o = ~~35μS~~ 30μs Limit = 1.5%	t_o + 60μS Limit = 1.0%
Ch 1	.5%	.5%
2	1.0	1.2 *
3	.5	.8
4	1.5	.5
5	1.2	.5
6	1.5	1.9 *
7	0	1.5 *
8	2.0 *	.2
9	.2	1.5 *
10	.7	.5
11	1.2	1.7 *
12	2.0 *	1.7 *
13	.4	1.7 *
14	1.2	1.0
15	1.2	.8
16	1.0	0

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer G. R. LANE Date 10-02-81

Test Supervisor [signature] III Date 10-3-81

Quality Control Stamp 1212 PG Ryan Date 10-21-81

* SEE FR S-8324

AND AUTHORIZATION TO MOVE NONCOMPLIANT HARDWARE DATED 10/22/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 12

OVERSHOOT		
Ch.	1	3.50%
	2	3.00%
	3	3.50%
	4	3.25%
	5	7.75%
	6	3.00%
	7	3.00%
	8	1.50%
	9	3.25%
	10	3.50%
	11	6.50%
	12	1.00%
	13	2.50%
	14	~~2.5~~ CRL 2.00%
	15	2.50%
	16	4.00%

Limit: 10 %

ORIGINAL PAGE IS
OF POOR QUALITY

RISETIME		
Ch.	1	14.0 μS
	2	13.5 μS
	3	13.5 μS
	4	14.0 μS
	5	13.0 μS
	6	14.5 μS
	7	14.0 μS
	8	15.0 μS
	9	14.0 μS
	10	14.5 μS
	11	12.5 μS
	12	14.5 μS
	13	14.0 μS
	14	14.5 μS
	15	14.0 μS
	16	14.0 μS

Limit: 20 μsec

Test Engineer C. R. Cole Date 10-03-81

Test Supervisor [illegible] Date 10-5-81

Quality Control Stamp I 118 ACCEPT P G Ryan Date 10/12/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 13

4.6 Boosted Frequency Response:

Limits (dB)	100Hz 0		1 kHz ±0.5		2 kHz ±0.5		5 kHz ±0.5	
Ch 1	0	db	.1	db	.1	db	.1	db
2	0		.04		.1		.1	
3	0		.1		.1		-.1	
4	0		.1		.2		.2	
5	0		.03		.1		.1	
6	0		.2		.3		.2	
7	0		.1		.1		.1	
8	0		.1		.2		.1	
9	0		-.1		-.1		.1	
10	0		.1		.1		.2	
11	0		.1		.1		.1	
12	0		.2		.3		.2	
13	0		.04		.1		.2	
14	0		.1		.2		.2	
15	0		.1		.1		.1	
16	0		.1		.1		.04	

Test Engineer C. R. Lane Date 10-01-81

Test Supervisor Date 10-5-81

Quality Control Stamp I 118 ACCEPT Date 10/12/81

SIZE	CODE IDENT NO	NUMBER
A	11323	1659 7
SCALE	REV H	SHEET 14

Limits (dB)	10 kHz +0.4 -0.6		20 kHz +0.4 -0.6		52 kHz -(3 +0/-0.5)		
Ch 1	.1	db	-.2	db	-3.10	db	*
2	-.2		-.5		-2.80		
3	-.3		-.5		-2.97		
4	-.04		-.2		-2.74		
5	.1		-.3		-3.05		*
6	-.1		-.4		-2.83		
7	-.3		-.6		-2.88		
8	-.2		-.4		-2.85		
9	-.1		-.5		-3.06		*
10	.1		-.2		-3.00		
11	.01		-.2		-2.94		
12	-.3		-.6		-2.75		
13	-.2		-.7	*	-2.92		
14	-.1		-.5		-2.93		
15	-.2		-.5		-2.91		
16	-.03		-.2		-2.90		

Test Engineer C. R. Lane Date 10-01-81

Test Supervisor [signature] III Date 10-5-81

Quality Control Stamp 1212 P. Ryan Date 10/12/81

CH 1, 5, 9, 13 OUT OF SPEC

* SEE F.R. S-8324/ ~~8330~~ ADDED TO 8324

31

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 15

ORIGINAL PAGE IS
OF POOR QUALITY

4.6

Channel	Boost Resistor Values	908600-( )	Rolloff Resistor Value	908600-( )
1	R1 3.92 K	-183	R65 88.7 K	-313
2	R9 3.74 K	-168	R73 19.6 K	-249
3	R2 3.09 K	-173	R66 45.3 K	-285
4	R10 3.09 K	-173	R74 47.5 K	-287
5	R3 4.53K	-189	R67 88.7 K	-313
6	R11 2.55 K	-165	R75 37.4 K	-277
7	R4 3.16 K	-174	R68 34.0 K	-273
8	R12 2.37 K	-162	R76 47.5 K	-287
9	R5 3.01 K	-172	R69 60.4 K	-297
10	R13 3.01 K	-172	R77 66.5 K	-301
11	R6 2.49 K	-164	R70 200K ~~[illegible]~~	908661-118 *
12	R14 2.43 K	-163	R78 21.0 K	-253
13	R7 3.01 K	-172	R71 22.1 K	-255
14	R15 2.61 K	-166	R79 20.0 K	-251
15	R8 2.94 K	-177	R72 37.4 K	-277
16	R16 2.55 K	-165	R80 73.2K	-305

Test Engineer C. R. Lane Date 10-05-81

Test Supervisor [signature] Date 10-5-81

Quality Control Stamp I 118 VERIFY DATA COMPLETE P.J. Ryan Date 10/12/81

* SEE ~~E.O. #~~ PJR

I 118 VERIFY THAT THIS RESISTOR COMES FROM THE APPROPRIATE SELECT LIST

-29 SELECT LIST

SIZE	CODE IDENT NO	NUMBER
A	11323	16507
SCALE	REV H	SHEET 10

FORM NO 0122 1 A 5 69 DIETERICH POST CLEARPRINT 1000H

4.6

Channel	Frequency Trim Capacitor Designator	Value	908505 -
1	C33	OPEN	N/A
3	C34		
5	C35		
7	C36		
9	C37		
11	C38		
13	C39		
15	C40		
2	C41		
4	C42		
6	C43		
8	C44		
10	C45		
12	C46		
14	C47		
16	C48	OPEN	N/A

CAPACITORS NOT REQUIRED

10-12-81

Planning Operation No. 600

Tested by C. R. Lane Date 10-05-81

Test Supervisor Martin C. Lawson Date 10-5-81

Quality Inspection Stamp I 118 VERIFY DATA COMPLETE P.B. Ryan Date 10/12/81

TITLE

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET

MIT:
2.4 pA

Ch	METER	POST-AMP OUT (dB)	PRE-AMP OUT (dB)	SCOPE GAIN (dB)	PRE-AMP OUT (mV)	FEEDBACK RESISTOR	WIDEBAND NOISE(pA)
1	.66 VRMS	+5.1	-18.6	27.6	1.80 ~~3.67~~ CRL	.84 X 10^9	2.1
2	.68	+5.2	-18.3		1.90	.87	2.2
3	.70	+5.2	-17.5		2.14	.96	2.2
4	.68	+5.5	-17.7		1.96	.95	2.1
5	.65	+5.1	-17.6		2.00	.95	2.1
6	.67	+5.5	-16.3		2.27	1.10	2.1
7	.62	+5.2	-17.6		1.87	.94	2.0
8	.65	+5.5	-16.1		2.30	1.15	2.0
9	.59	+5.2	-17.1		1.89	1.00	1.9
10	.59	+5.4	-17.5		1.76	.97	1.8
11	.57	+5.5	-15.9		2.02	1.15	1.8
12	.65	+5.4	-17.2		2.01	1.00	2.0
13	.68	+5.6	-18.7		1.73	.84	2.1
14	.62	+5.3	-17.1		1.96	1.00	2.0
15	.67	+5.5	-18.4		1.78	.88	2.0
16	.71	+5.3	-18.6	27.6	1.89	.85	2.2

Test Engineer C. R. Lane Date 10-1-81

Test Supervisor [illegible] Date 10-5-81

Quality Control Stamp I 118 ACCEPT NOISE VALUES, VERIFY OTHER DATA COMPLETE Date 10/12/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 1?

ORIGINAL PAGE IS
OF POOR QUALITY

Crosstalk

Limit: -40 dB -60 dB

Source Channel	Nearest Neighbors								Average of Non-Neighbors	
1					2	-59	3	-44	-60	
2			1	-57	3	-60	4	-41	-62	
3	1	-46	2	-64	4	-62	5	-43	-61	
4	2	-47	3	-60	5	-60	6	-42	-66	
5	3	-46	4	-62	6	-58	7	-41	-59	*
6	4	-47	5	-63	7	-61	8	-46	-65	
7	5	-44	6	-60	8	-61	9	-47	-59	*
8	6	-47	7	-61	9	-60	10	-47	-64	
9	7	-49	8	-62	10	-60	11	-42	-58	*
10	8	-48	9	-61	11	-60	12	-45	-64	
11	9	-47	10	-59	12	-57	13	-44	-61	
12	10	-46	11	-63	13	-60	14	-46	-64	
13	11	-46	12	-58	14	-57	15	-44	-60	
14	12	-45	13	-53	15	-63	16	-44	-63	
15	13	-43	14	-60	16	-57			-60	
16	14	-46	15	-62					-63	

Test Engineer C. R. Lene Date 10-02-81

Test Supervisor [illegible] Date 10-5-81

Quality Control Stamp PJ Ryan Date 10/12/81

* CH 5,7,9 OUT OF SPEC

* SEE F.R. #5-8324

C-2

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 19

ORIGINAL PAGE IS
OF POOR QUALITY

4.9 Ground Continuity and Isolation

REQUIREMENTS:

Signal GND Continuity	8.3 Ohms	Limit: (< 11 Ohms)	
Signal GND-PWR Gnd Isolation	✓	OK	(>1 M ohms)
Signal GND-Chassis Isolation	✓	OK	(>1 M ohms)
J1-16 ODD to J1-16 EVEN	✓	OK	(<25 ohms all bands)

4.10 Time Delay

Channel	Rise Time	Fall Time
1	11.8μS	12.2μS
2	12.0μS	12.6μS
3	11.6μS	12.2μS
4	11.5μS	12.2μS
5	11.8μS	12.2μS
6	11.6μS	12.2μS
7	11.4μS	12.0μS
8	11.4μS	12.0μS
9	11.4μS	12.0μS
10	11.4μS	12.0μS
11	11.4μS	11.8μS
12	11.6μS	12.0μS
13	11.6μS	12.2μS
14	11.8μS	12.6μS
15	11.6μS	12.2μS
16	11.4μS	11.8μS

ORIGINAL PAGE IS
OF POOR QUALITY

Test Engineer C. R. Lane Date 10-02-81

Test Supervisor [signature] Date 10-5-81

ACCEPT 4.4 ONLY

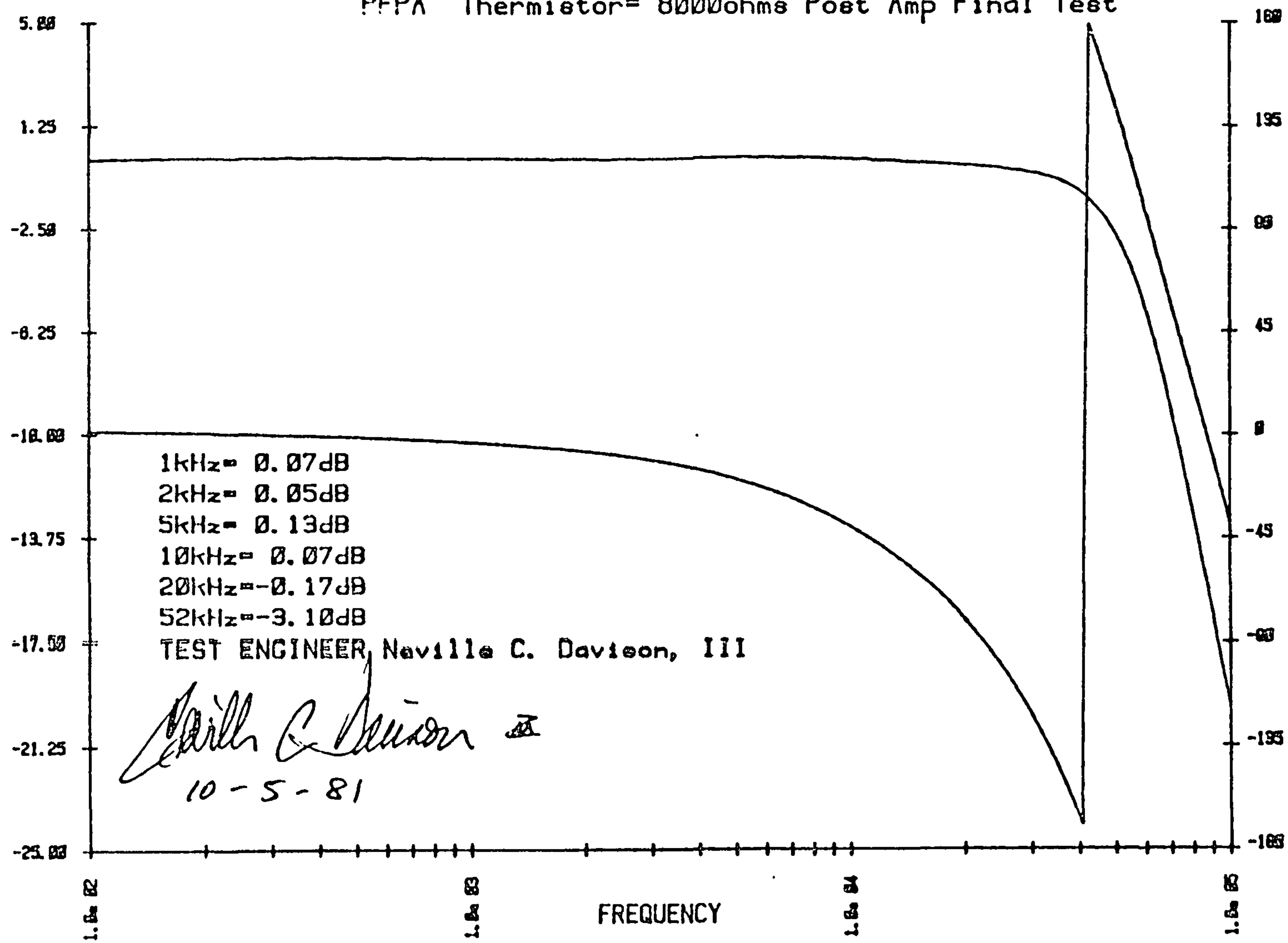
Quality Control Date 10-12-81

VERIFY 4.10 DATA COMPLETE

PB Ryan

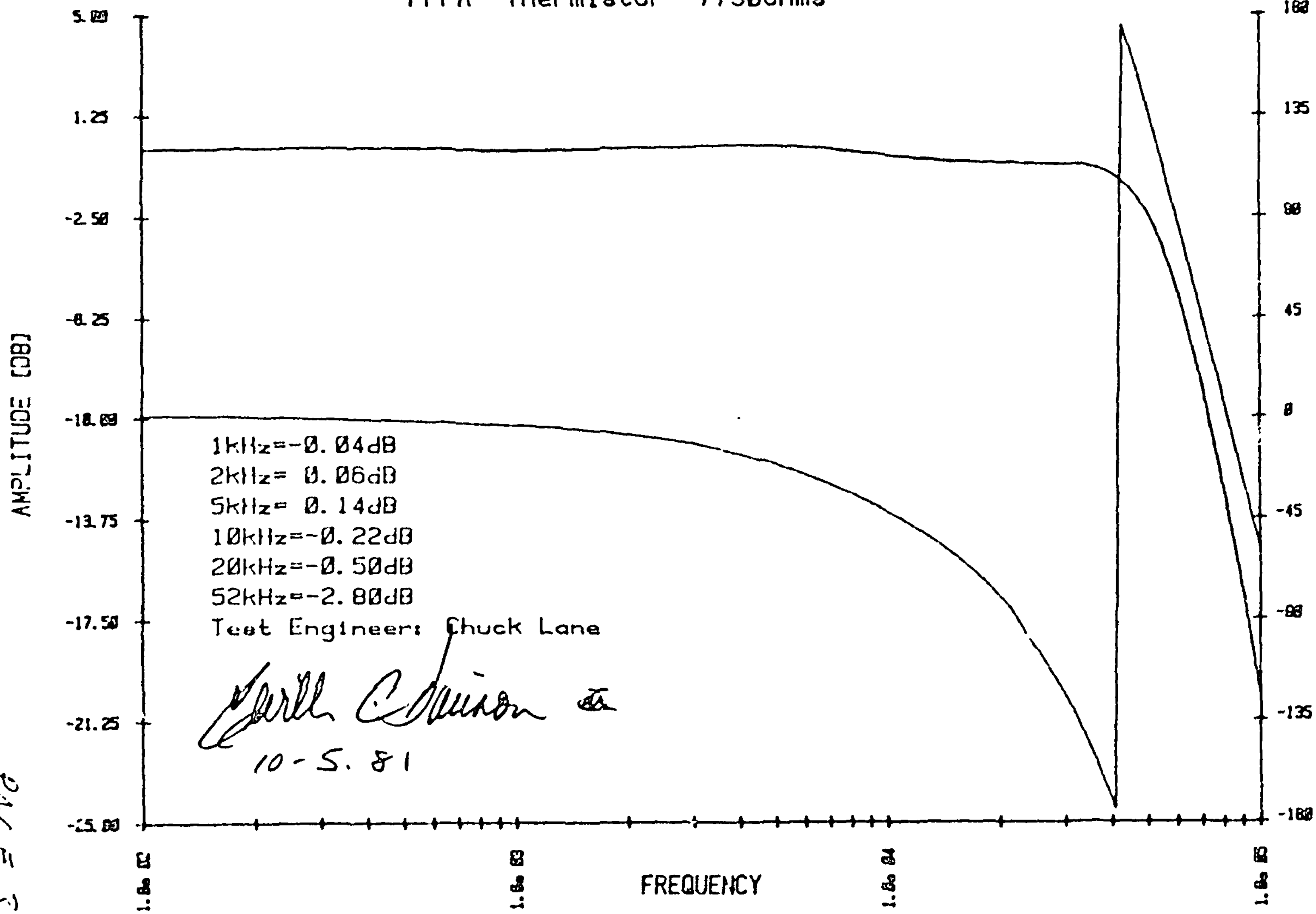
SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV	SHEET

BAND 2 CHANNEL 1 Sept. 25, 1981
PFPA Thermistor= 8000ohms Post Amp Final Test



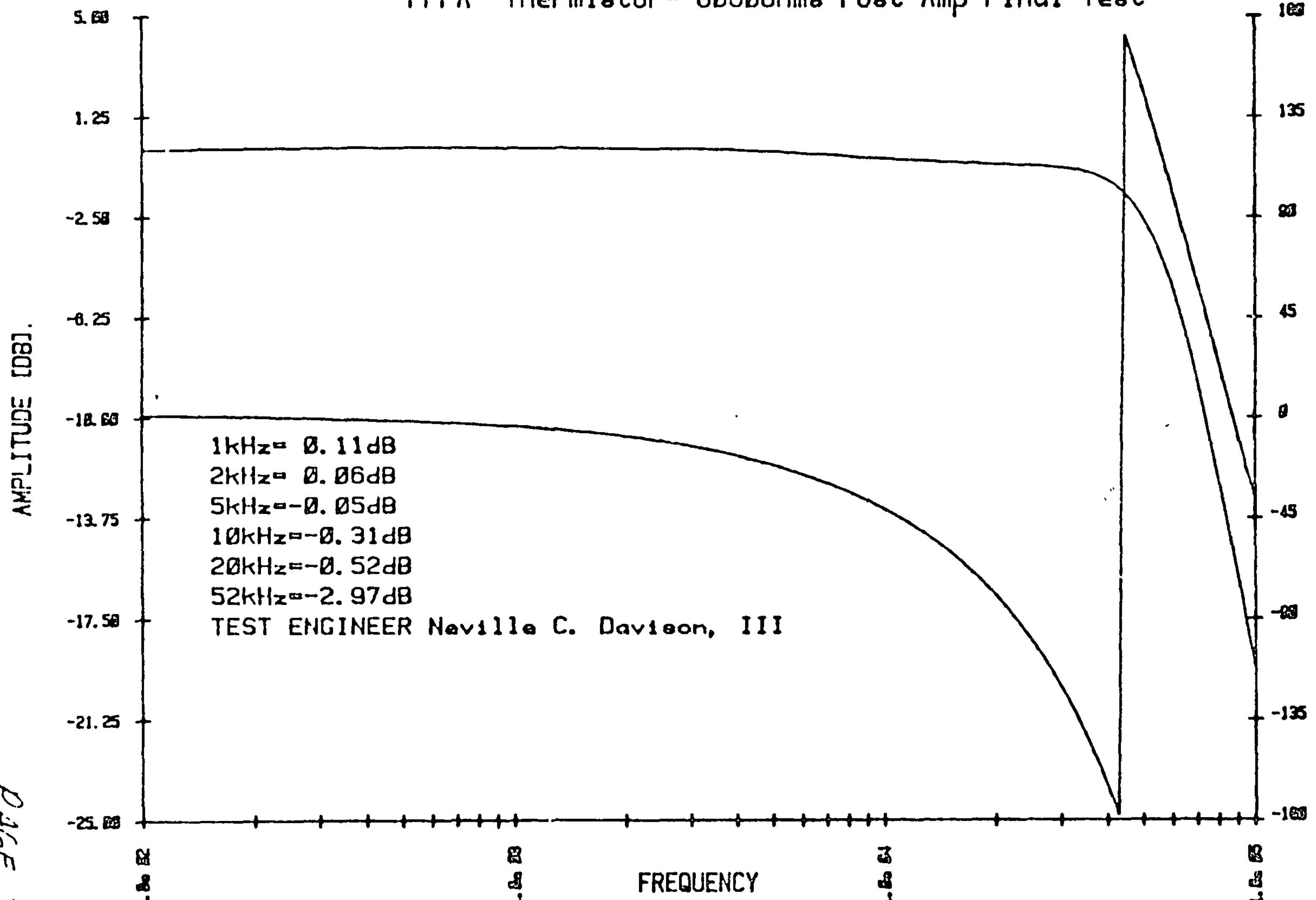
BAND 2 CHANNEL 2 10/01/81

PFPA Thermistor= 7790ohms



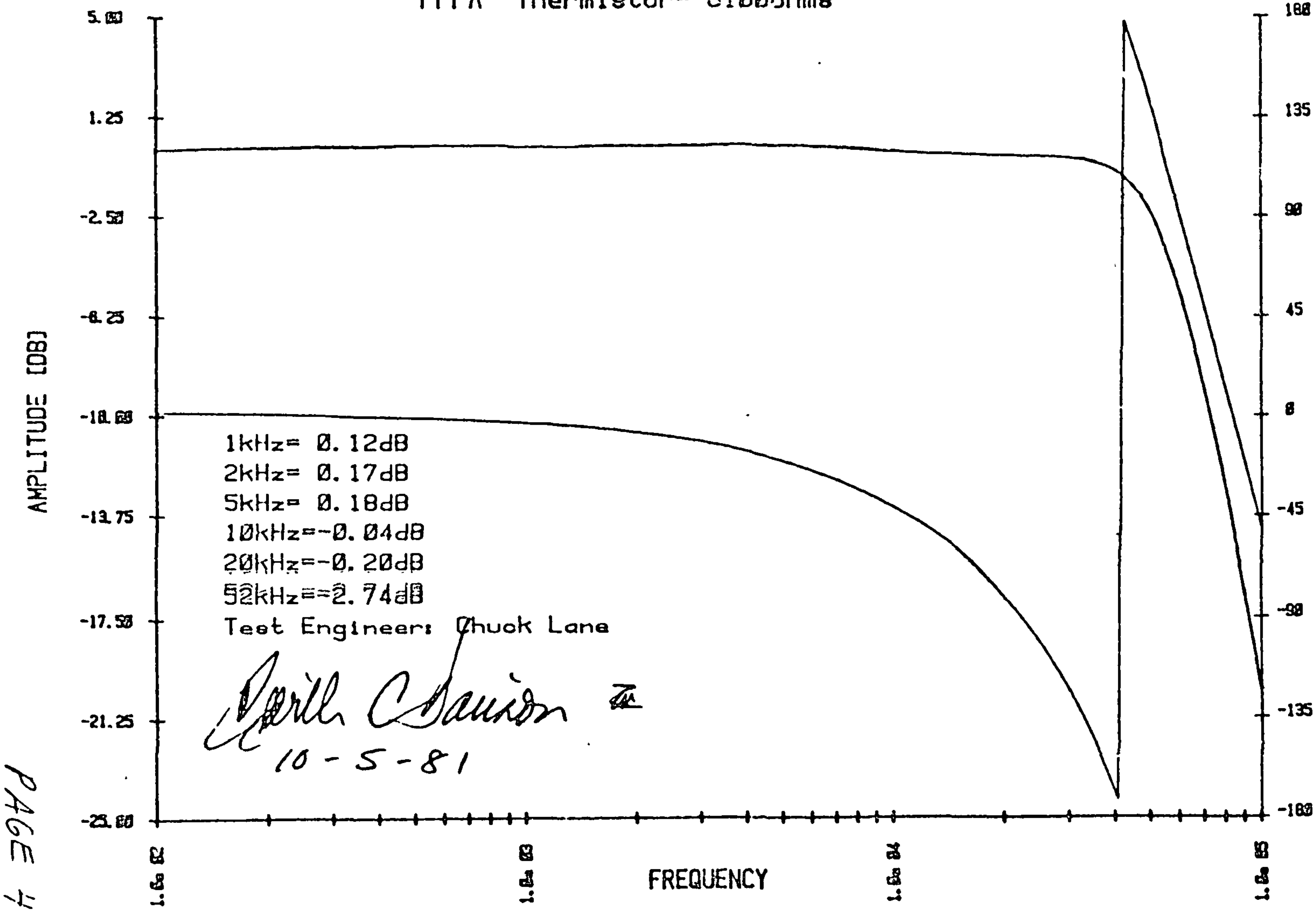
BAND 2 CHANNEL 3 Sept. 25, 1981

PFPA Thermistor= 8060ohms Post Amp Final Test



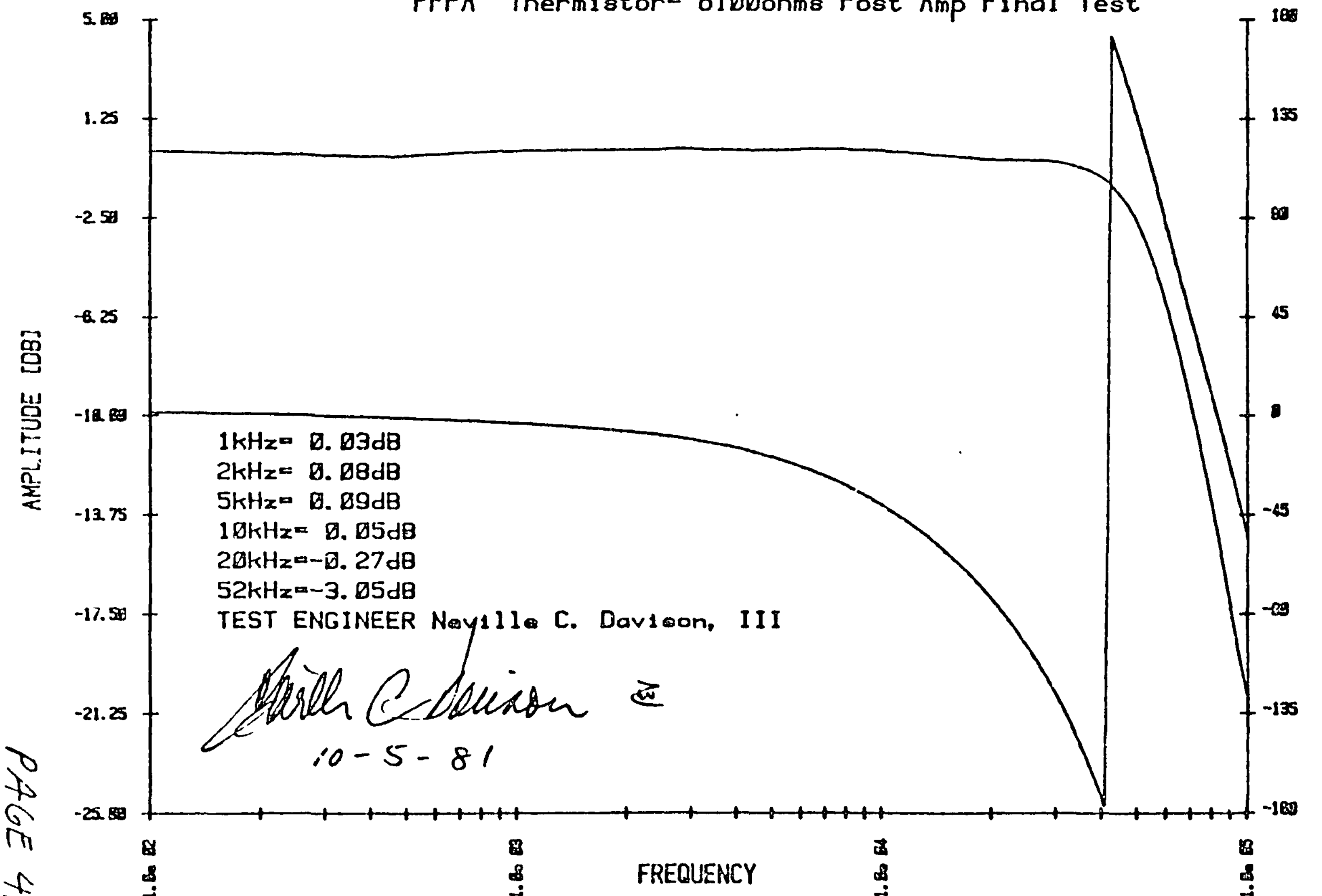
BAND 2 CHANNEL 4 10/01/81

PFPA Thermistor= 8100ohms



BAND 2 CHANNEL 5 Sept. 25, 1981

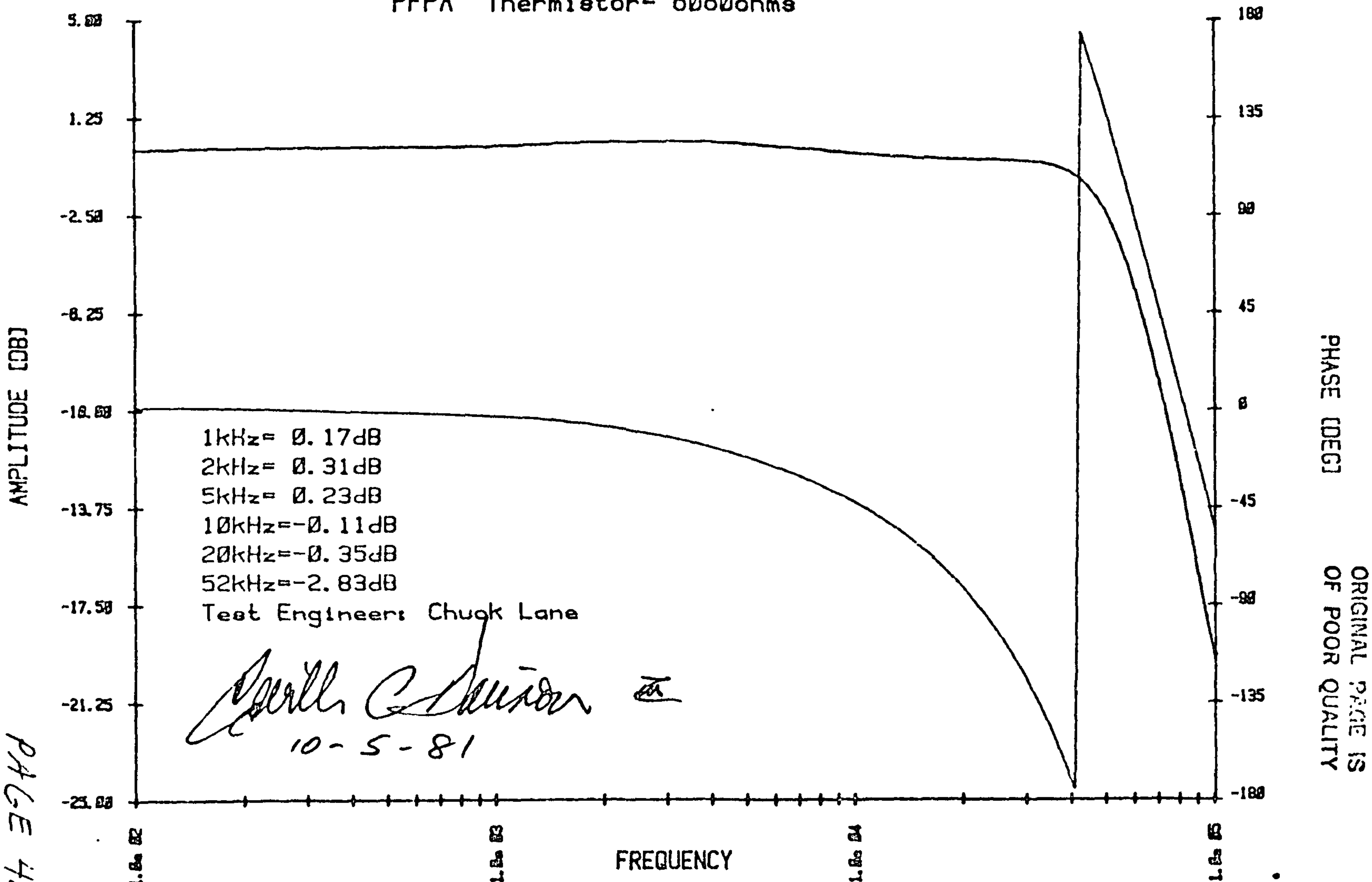
PFPA Thermistor= 8100ohms Post Amp Final Test



ORIGINAL PAGE IS OF POOR QUALITY

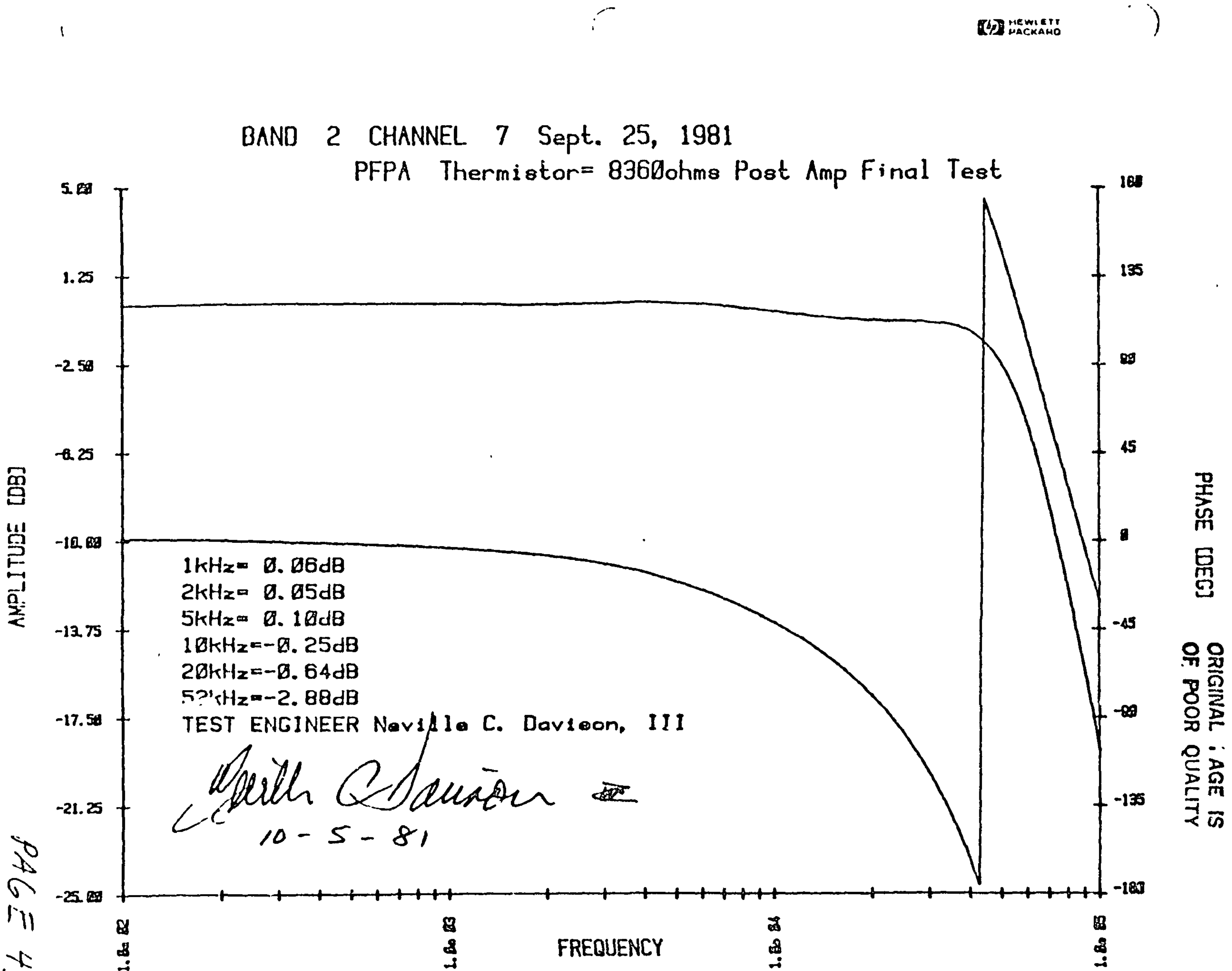
BAND 2 CHANNEL 6 10/01/81

PFPA Thermistor= 8080ohms



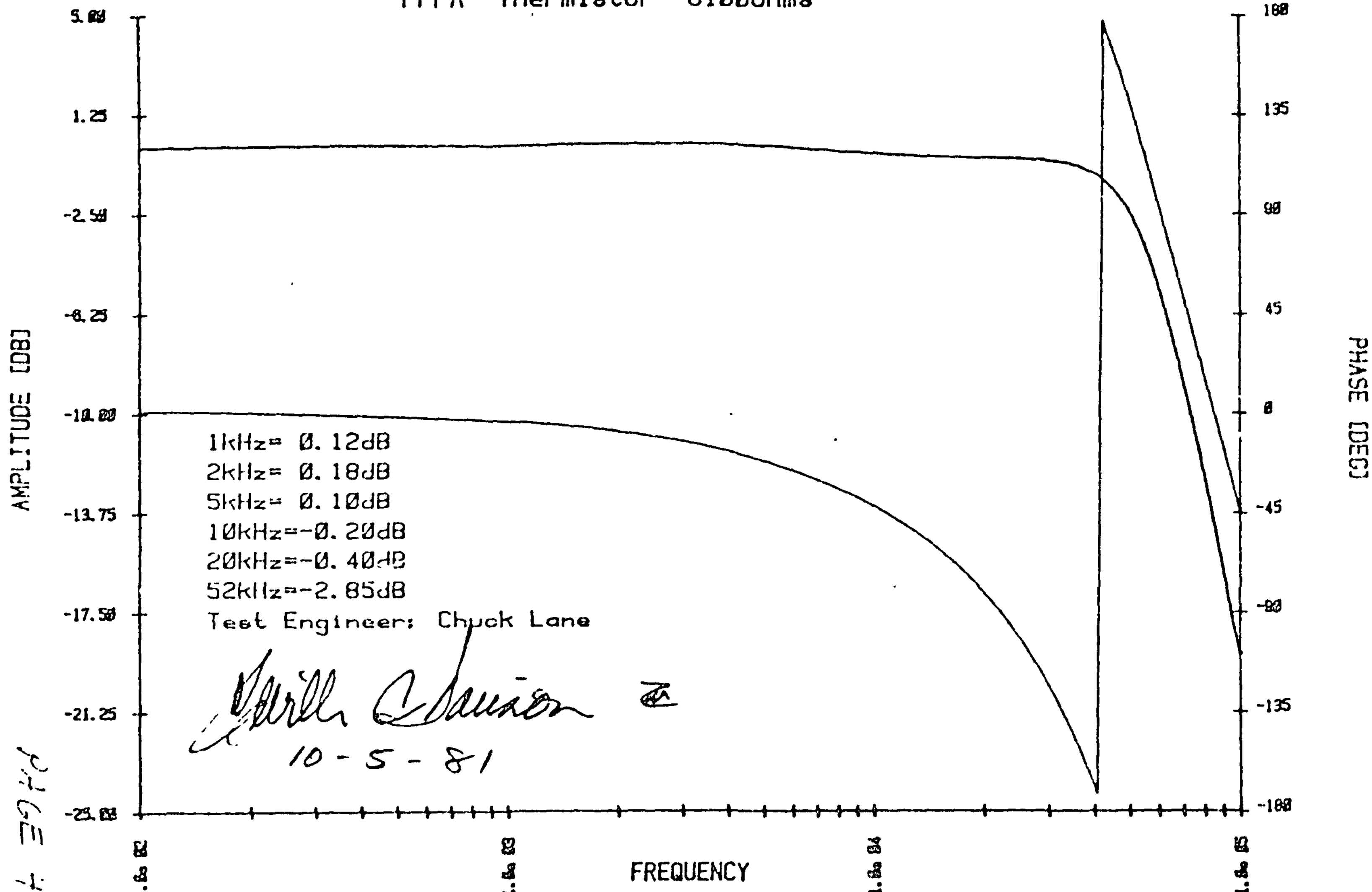
BAND 2 CHANNEL 7 Sept. 25, 1981

PFPA Thermistor= 8360ohms Post Amp Final Test



ORIGINAL PAGE IS OF POOR QUALITY

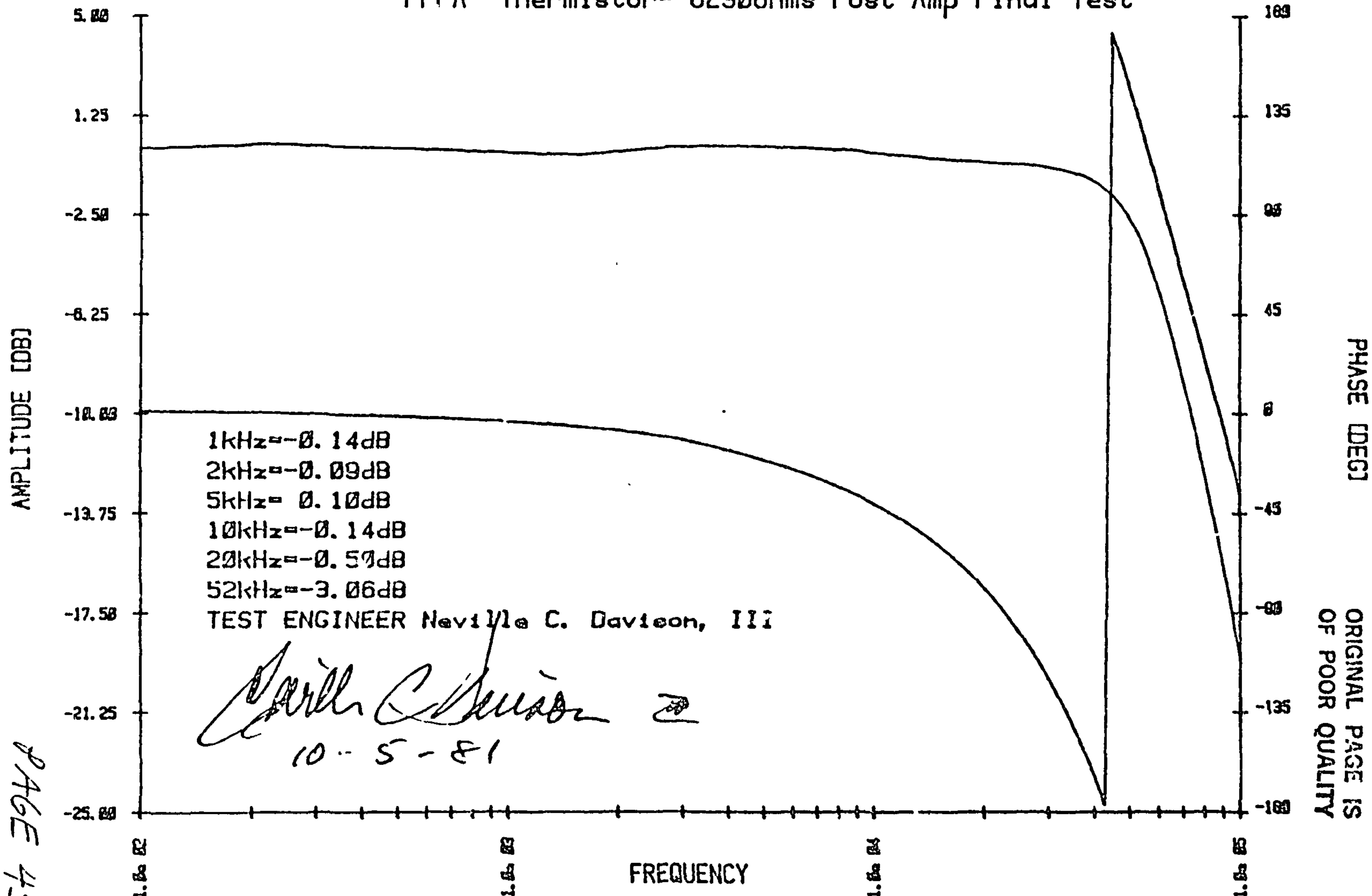
BAND 2 CHANNEL 8 10/01/81
PFPA Thermistor= 8100ohms



HEWLETT PACKARD

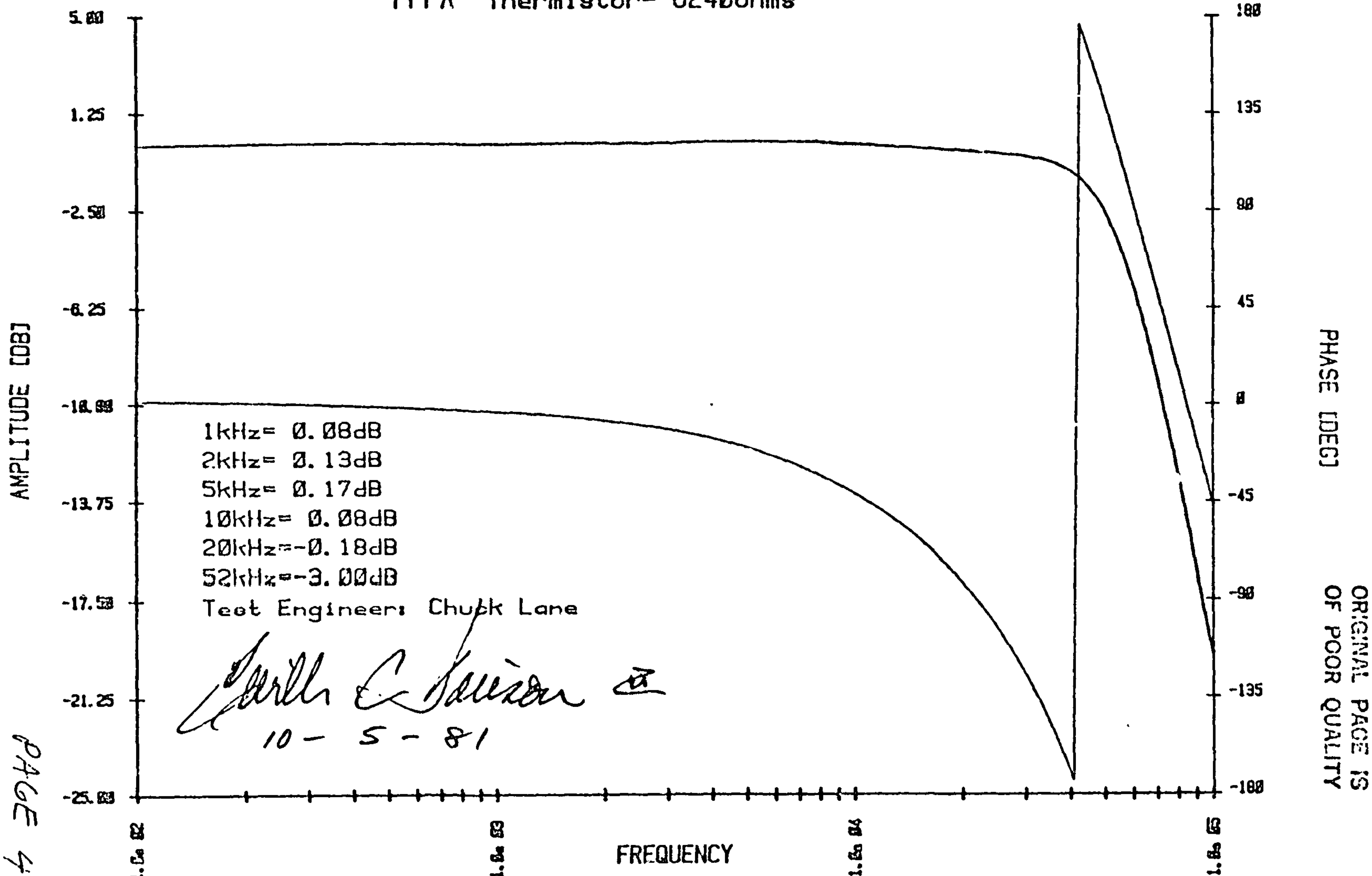
BAND 2 CHANNEL 9 Sept. 25, 1981

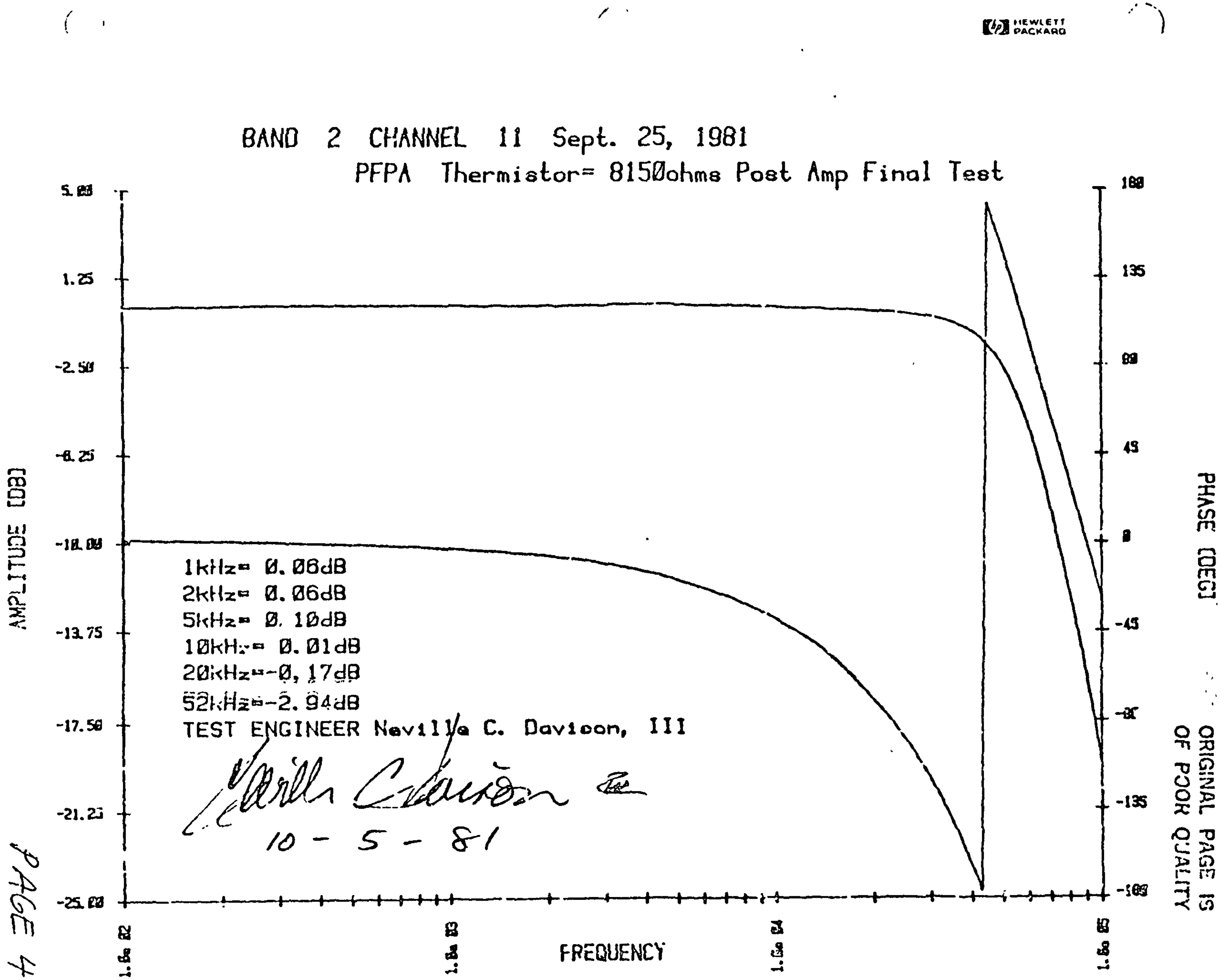
PFPA Thermistor= 829Øohms Post Amp Final Test



BAND 2 CHANNEL 10 10/01/81

PFPA Thermistor= 8240ohms

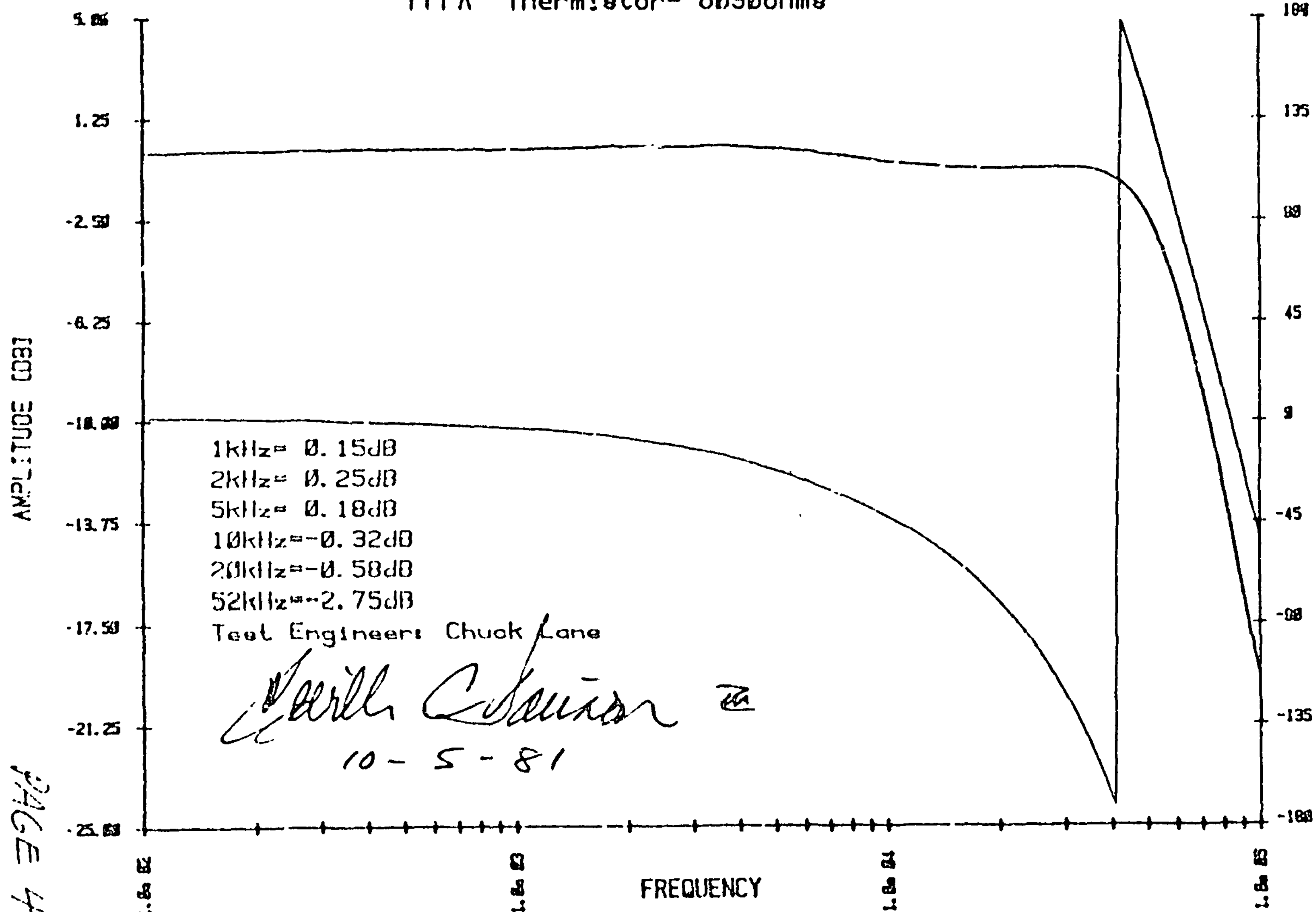




ORIGINAL PAGE IS
OF POOR QUALITY

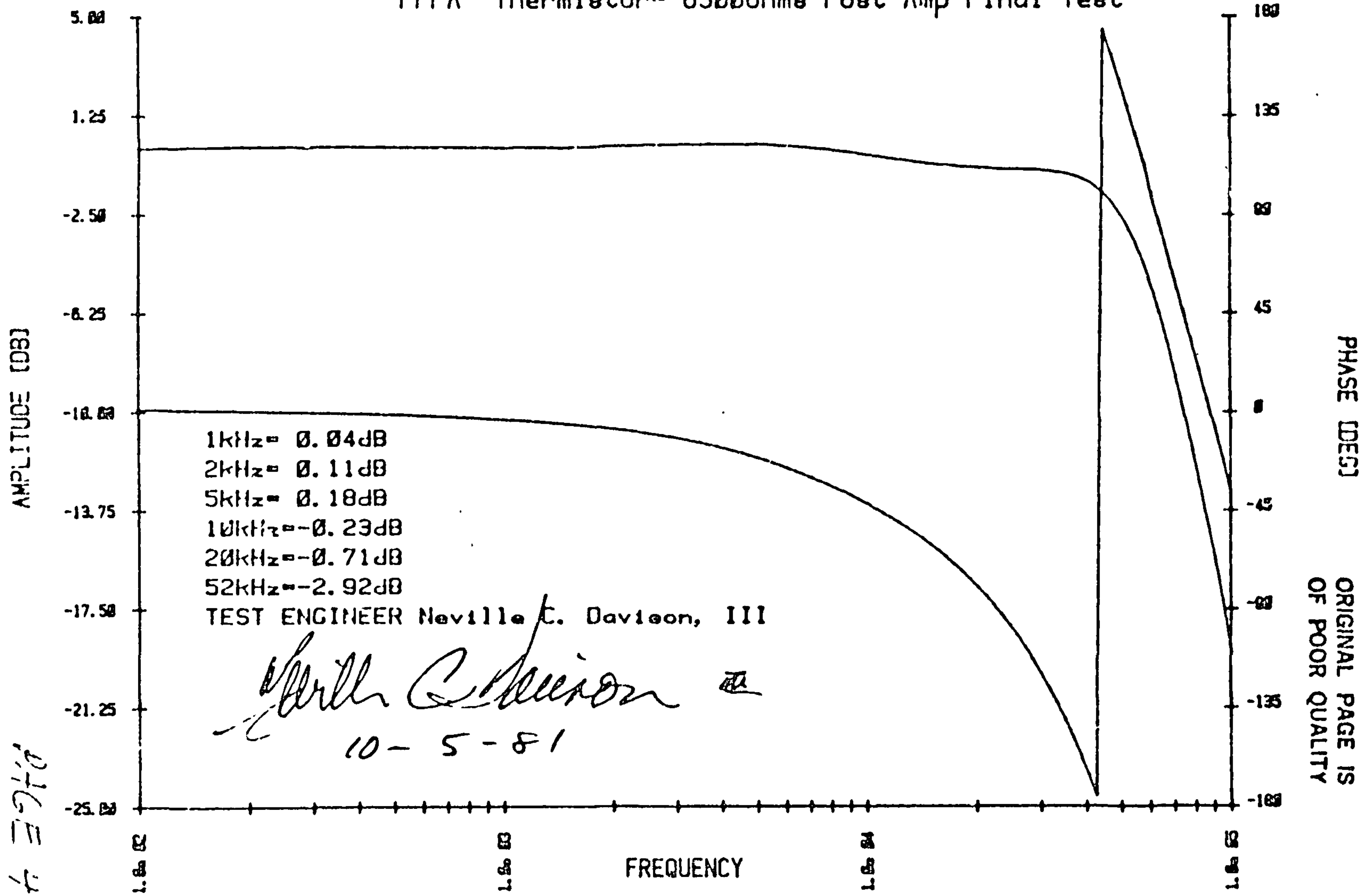
BAND 2 CHANNEL 12 10/01/81

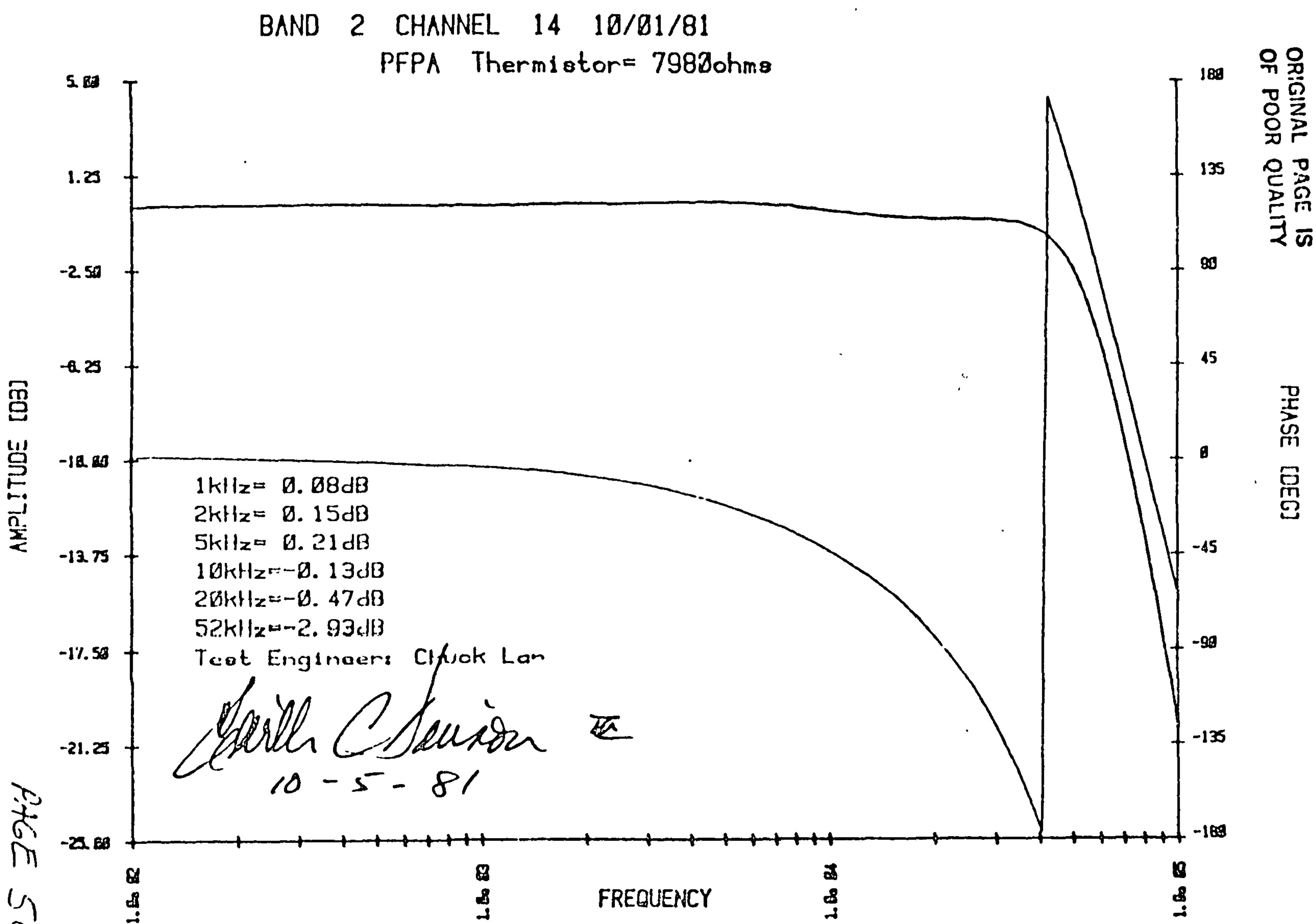
PFPA Thermistor= 8090ohms



ORIGINAL PAGE IS
OF POOR QUALITY

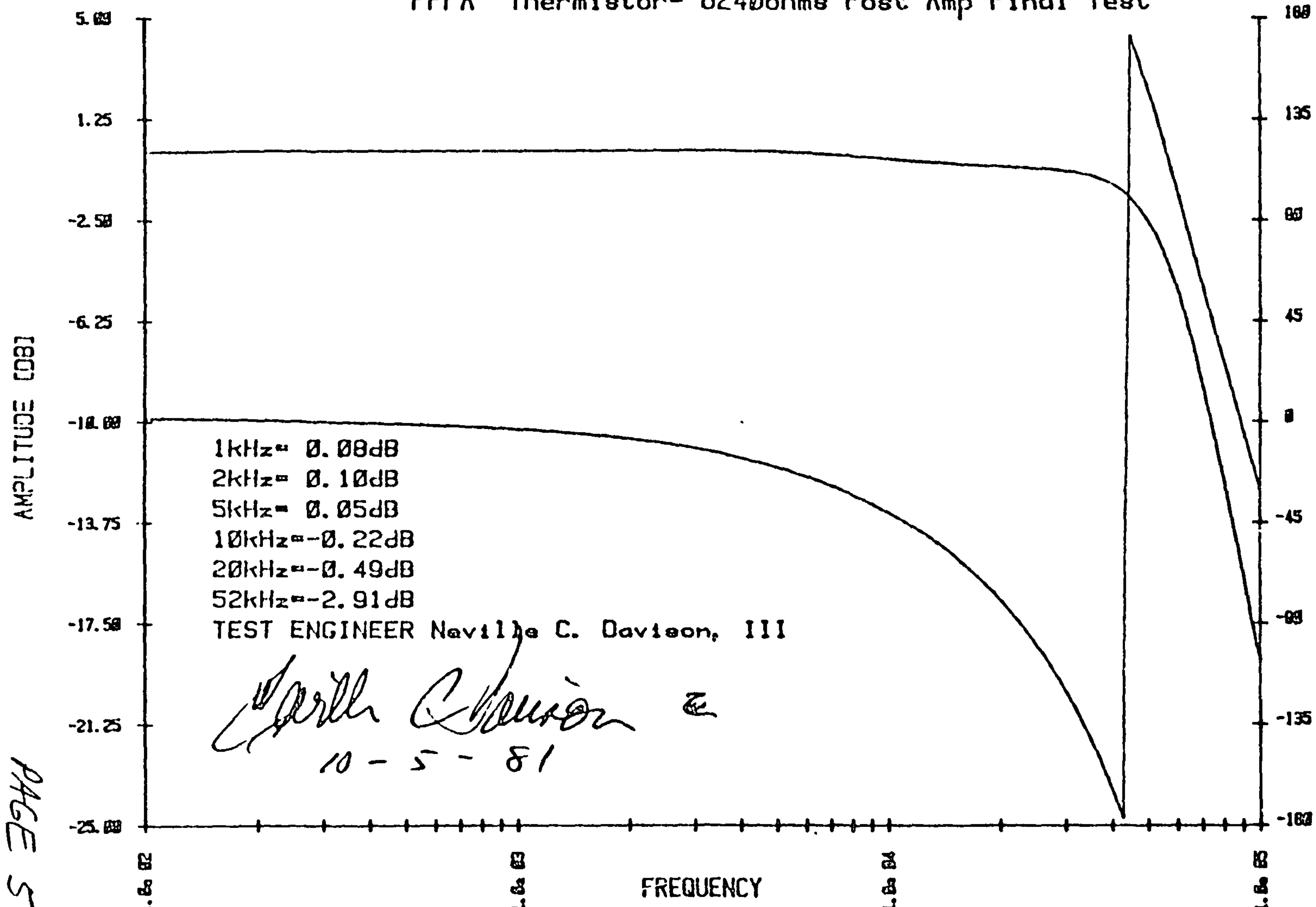
BAND 2 CHANNEL 13 Sept. 25, 1981
PFPA Thermistor= 8300ohms Post Amp Final Test





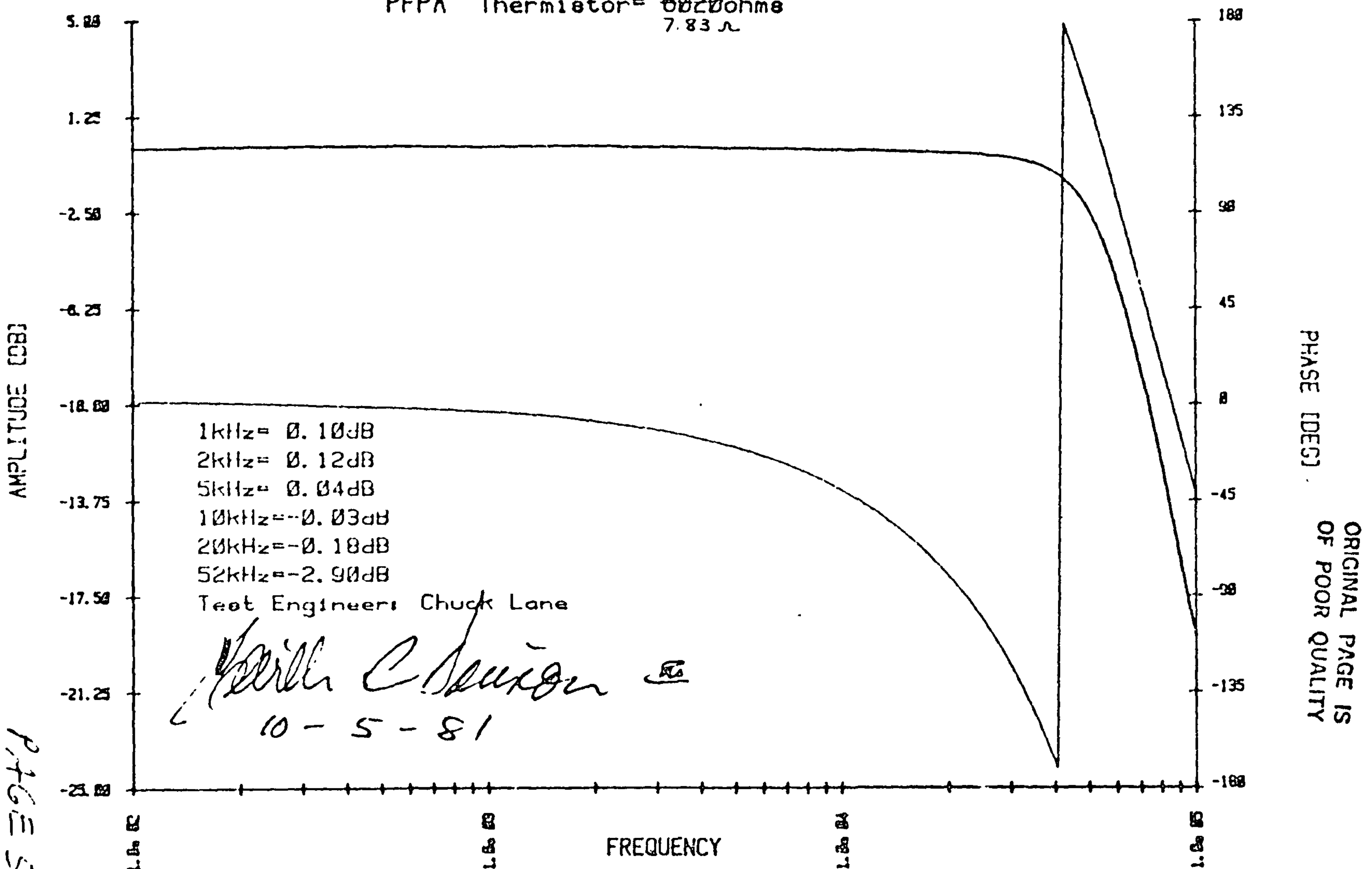
BAND 2 CHANNEL 14 10/01/81
PFPA Thermistor= 7980ohms
AMPLITUDE [DB]
PHASE [DEG]
FREQUENCY
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
180
135
90
45
0
-45
-90
-135
-180
1kHz= 0.08dB
2kHz= 0.15dB
5kHz= 0.21dB
10kHz=-0.13dB
20kHz=-0.47dB
52kHz=-2.93dB
Test Engineer: Chuck Lan
10-5-81

BAND 2 CHANNEL 15 Sept. 25, 1981
PFPA Thermistor= 8240ohms Post Amp Final Test



BAND 2 CHANNEL 16 10/01/81

PFPA Thermistor= ~~6020~~ohms cal 7.83 Ω



ORIGINAL PAGE IS OF POOR QUALITY

HEWLETT PACKARD

...IME FOCAL PLANE CROSSTALK Band 2

Source Frequency= 50000 Hz Date: 10/02/81

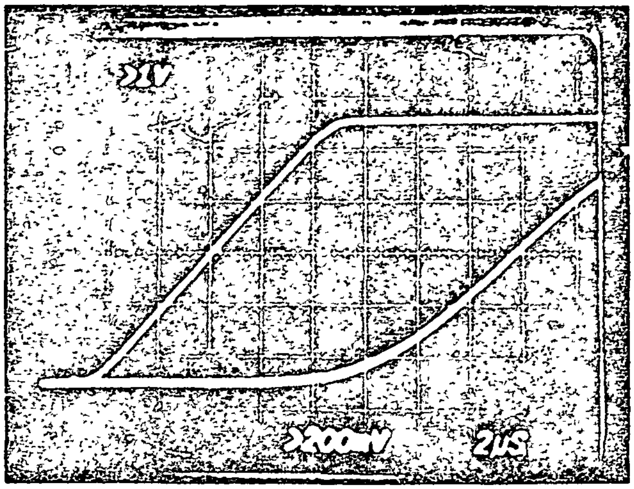
Chan	Nearest Neighbors Limit: -40dB				Non-Neighbors Average Limit: -60dB
1			Ch 2=-59	Ch 3=-44	Average=-60
2		Ch 1=-57	Ch 3=-60	Ch 4=-41	Average=-62
3	Ch 1=-46	Ch 2=-64	Ch 4=-62	Ch 5=-43	Average=-61
4	Ch 2=-47	Ch 3=-60	Ch 5=-60	Ch 6=-42	Average=-66
5	Ch 3=-46	Ch 4=-62	Ch 6=-58	Ch 7=-41	Average=-59
6	Ch 4=-47	Ch 5=-63	Ch 7=-61	Ch 8=-46	Average=-65
7	Ch 5=-44	Ch 6=-60	Ch 8=-61	Ch 9=-47	Average=-59
8	Ch 6=-47	Ch 7=-61	Ch 9=-60	Ch 10=-47	Average=-64
9	Ch 7=-49	Ch 8=-62	Ch 10=-60	Ch 11=-42	Average=-58
10	Ch 8=-48	Ch 9=-61	Ch 11=-60	Ch 12=-45	Average=-64
11	Ch 9=-47	Ch 10=-59	Ch 12=-57	Ch 13=-44	Average=-61
12	Ch 10=-46	Ch 11=-63	Ch 13=-60	Ch 14=-46	Average=-64
13	Ch 11=-46	Ch 12=-58	Ch 14=-57	Ch 15=-44	Average=-60
14	Ch 12=-45	Ch 13=-53	Ch 15=-63	Ch 16=-44	Average=-63
15	Ch 13=-43	Ch 14=-60	Ch 16=-57		Average=-60
16	Ch 14=-46	Ch 15=-62			Average=-63

Test Engineer: / Chuck Lane

Keith C. Lauson 10-5-81

ORIGINAL PAGE IS OF POOR QUALITY

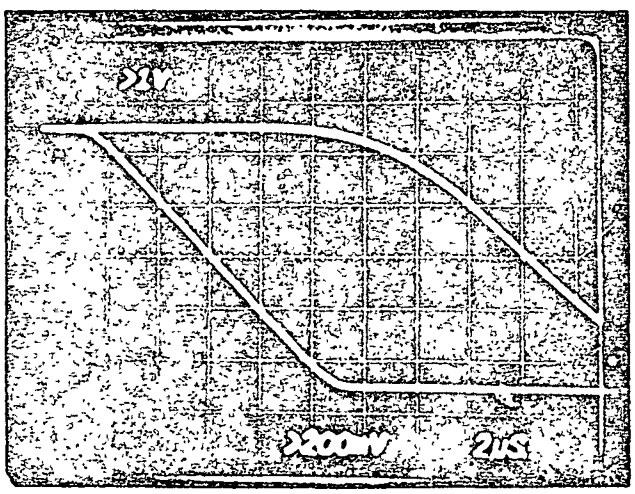
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 2
CHANNEL: 1

DATE: 10-05-81

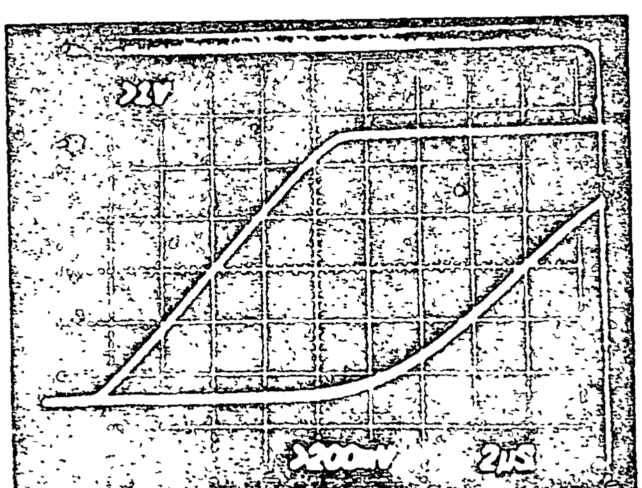
TIME: 11.8 μS



BAND: 2
CHANNEL: 1

DATE: 10-05-81

TIME: 12.2 μS



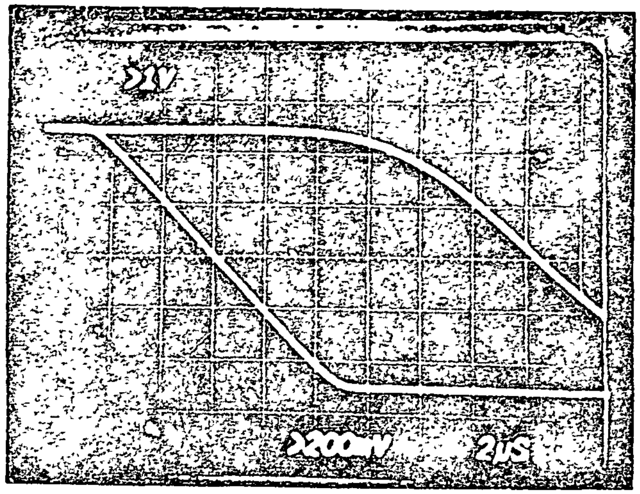
BAND: 2
CHANNEL: 2

DATE: 10-05-81

TIME: 12.0 μS

N. C. DAVISON, III

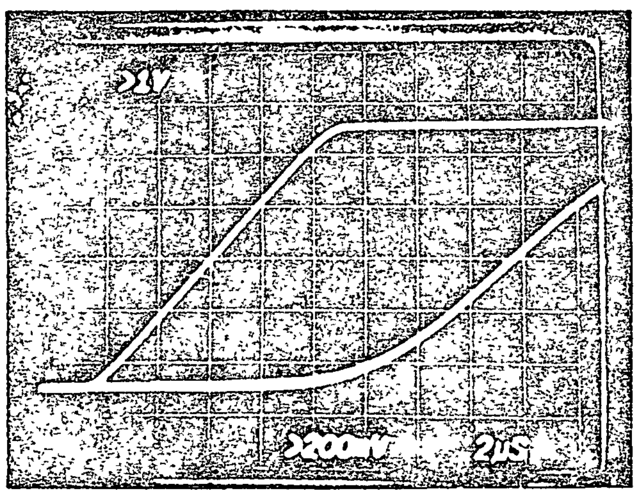
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 2
CHANNEL: 2

DATE: 10-05-81

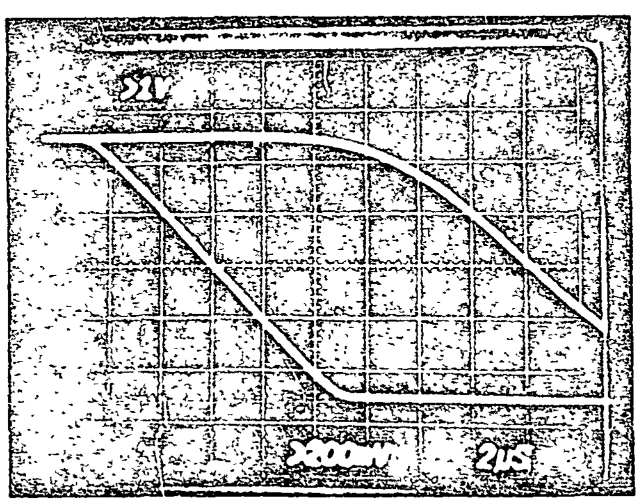
TIME: 12.6μS



BAND: 2
CHANNEL: 3

DATE: 10-05-81

TIME: 11.6μS

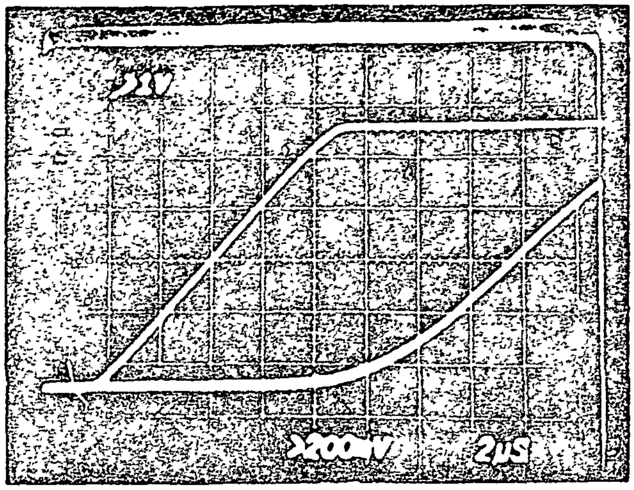


BAND: 2
CHANNEL: 3

DATE: 10-05-81

TIME: 12.2μS

N. C. DAVISON, III

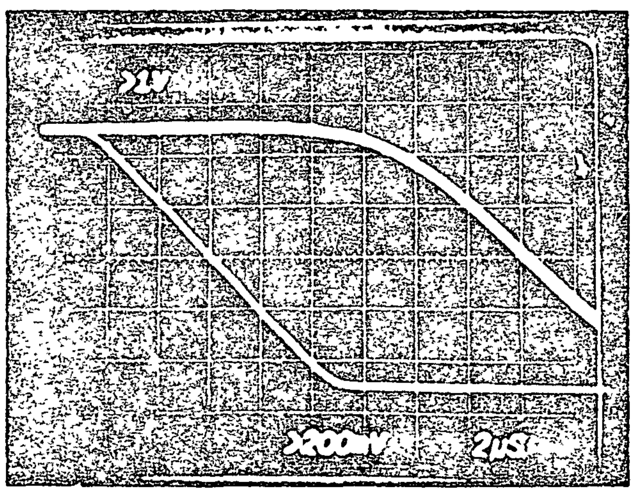


ORIGINAL PAGE IS
OF POOR QUALITY

BAND: 2
CHANNEL: 4

DATE: 10-05-81

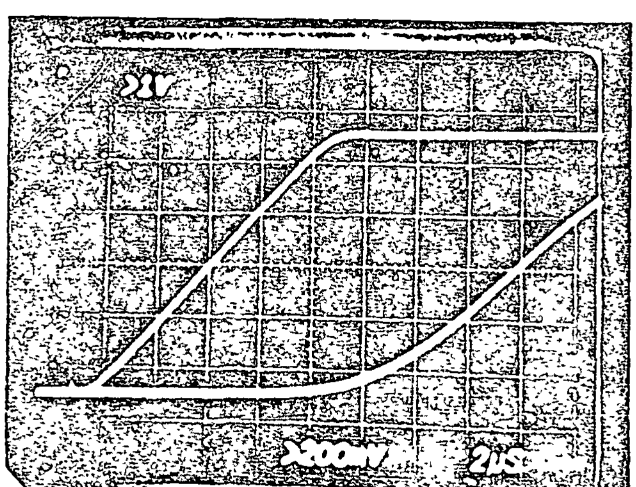
TIME: 11.5µS



BAND: 2
CHANNEL: 4

DATE: 10-05-81

TIME: 12.2µS

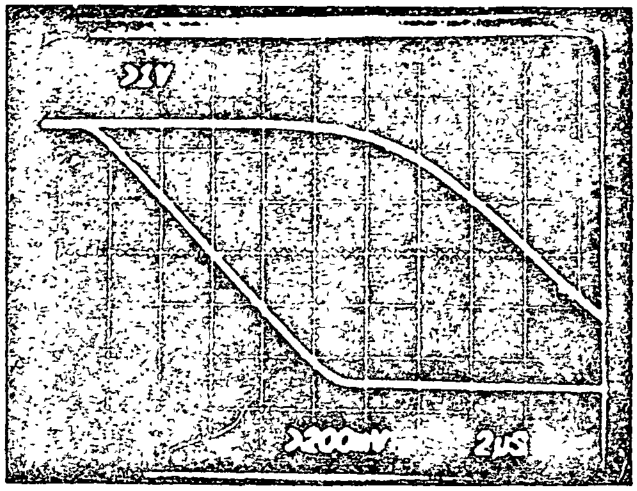


BAND: 2
CHANNEL: 5

DATE: 10-05-81

TIME: 11.8µS

N. C. DAVISON, III

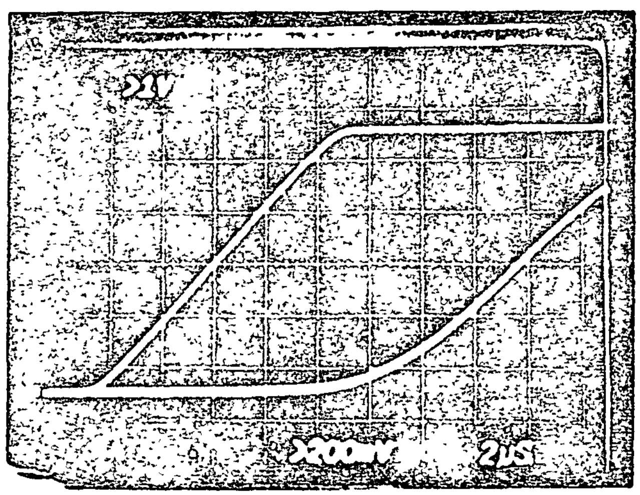


ORIGINAL PAGE IS
OF POOR QUALITY

BAND: 2
CHANNEL: 5

DATE: 10-05-81

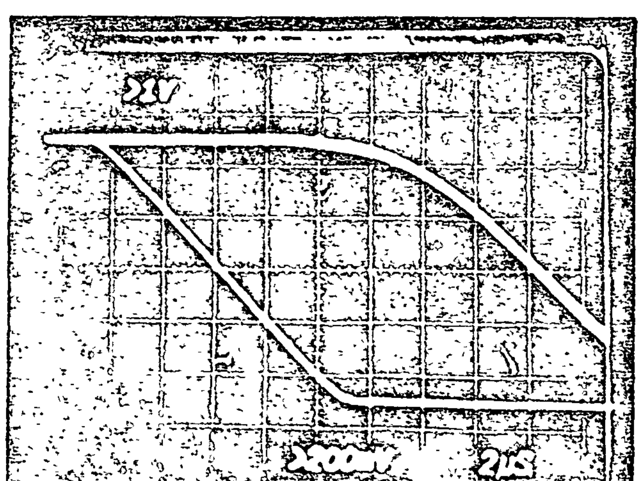
TIME: 12.2μS



BAND: 2
CHANNEL: 6

DATE: 10-05-81

TIME: 11.6μS



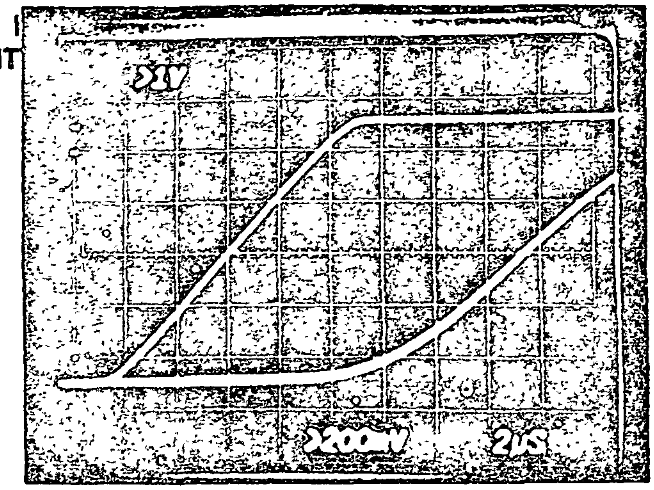
BAND: 2
CHANNEL: 6

DATE: 10-05-81

TIME: 12.2μS

N. C. DAVISON, III

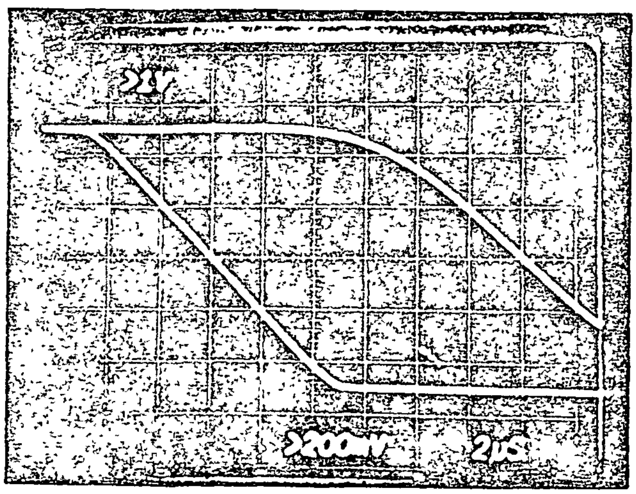
ORIGINAL PAGE I
OF POOR QUALIT



BAND: 2
CHANNEL: 7

DATE: 10-05-81

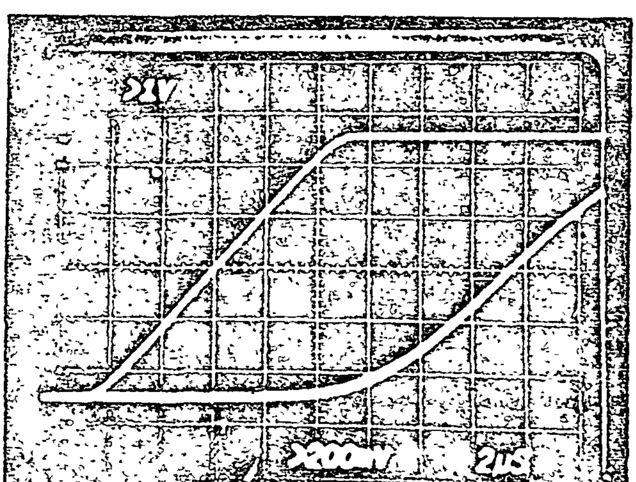
TIME: 11.4μS



BAND: 2
CHANNEL: 7

DATE: 10-05-81

TIME: 12.0μS



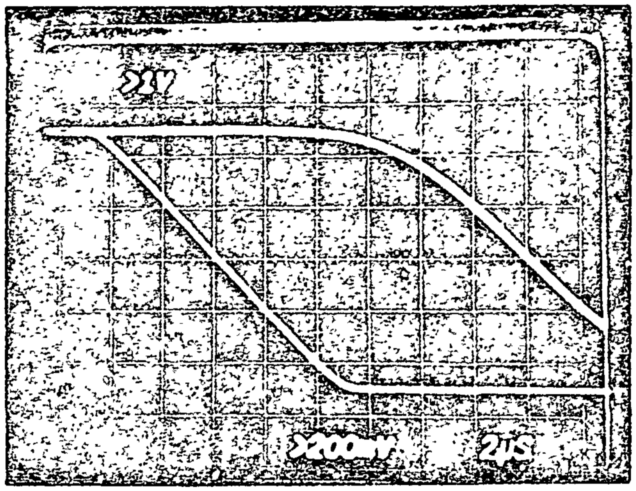
BAND: 2
CHANNEL: 8

DATE: 10-05-81

TIME: 11.4μS

N. C. Davison, III

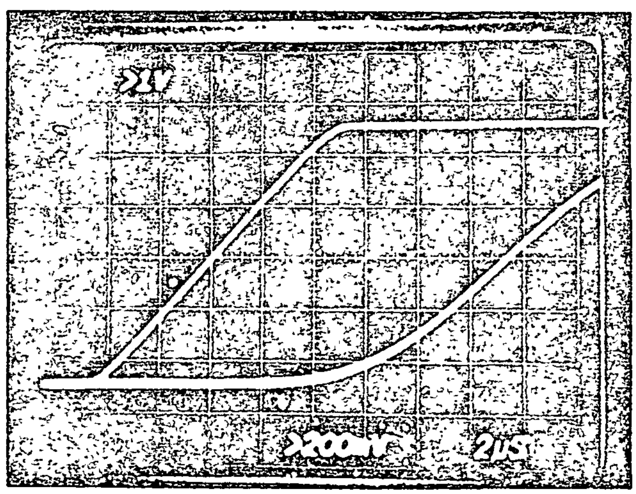
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 2
CHANNEL: 8

DATE: 10-05-81

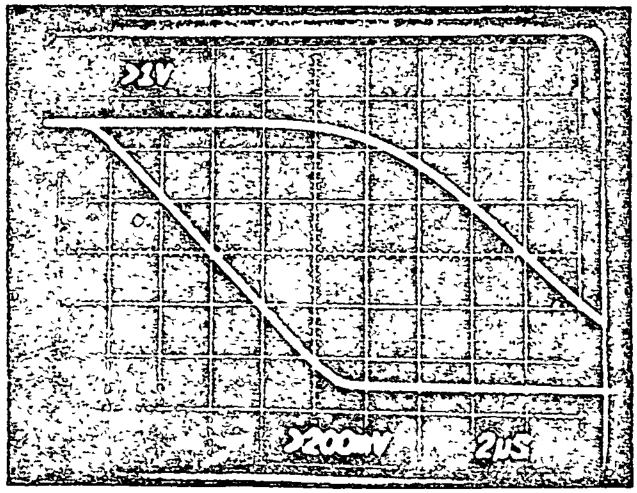
TIME: 12.0µS



BAND: 2
CHANNEL: 9

DATE: 10-05-81

TIME: 11.4µS



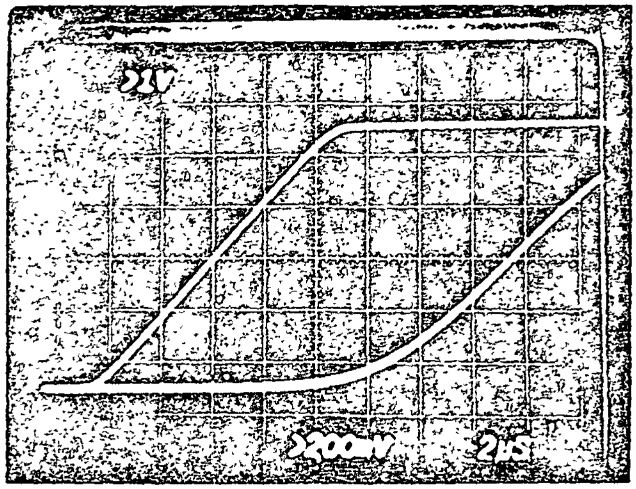
BAND: 2
CHANNEL: 9

DATE: 10-05-81

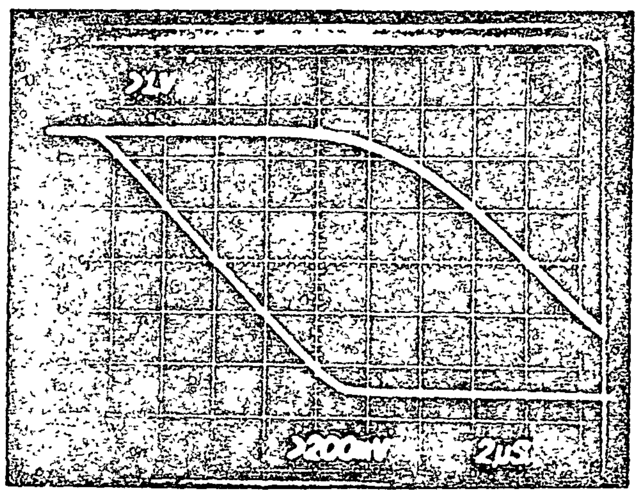
TIME: 12.0µS

N. C. Davison, III

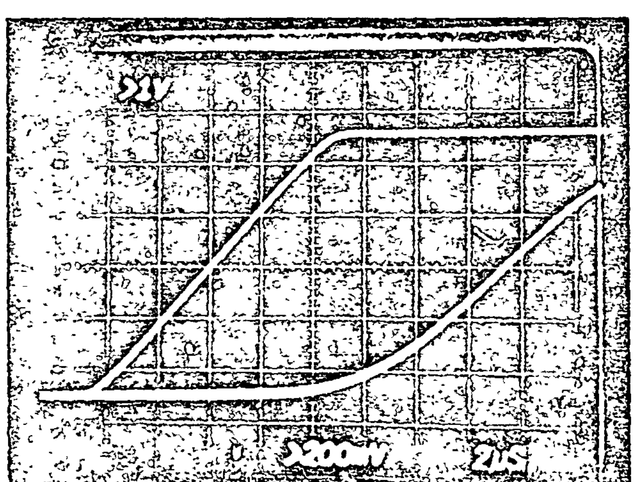
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 2
CHANNEL: 10
DATE: 10-05-81
TIME: 11.4μS

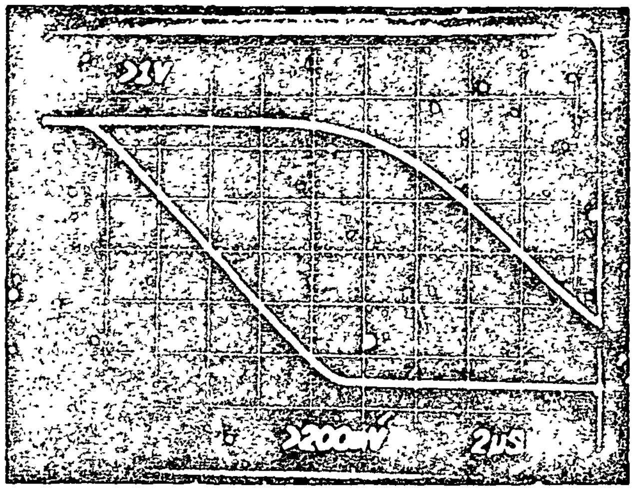


BAND: 2
CHANNEL: 10
DATE: 10-05-81
TIME: 12.0μS



BAND: 2
CHANNEL: 11
DATE: 10-05-81
TIME: 11.4μS

N. C. Davis... III

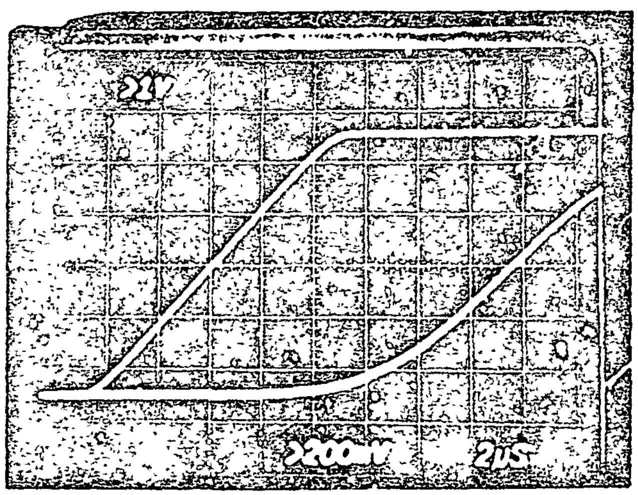


ORIGINAL PAGE IS
OF POOR QUALITY

BAND: 2
CHANNEL: 11

DATE: 10-05-81

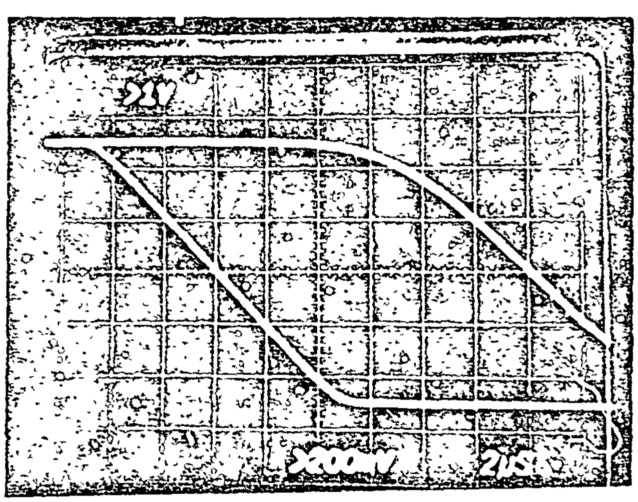
TIME: 11.8µS



BAND: 2
CHANNEL: 12

DATE: 10-05-81

TIME: 11.6µS

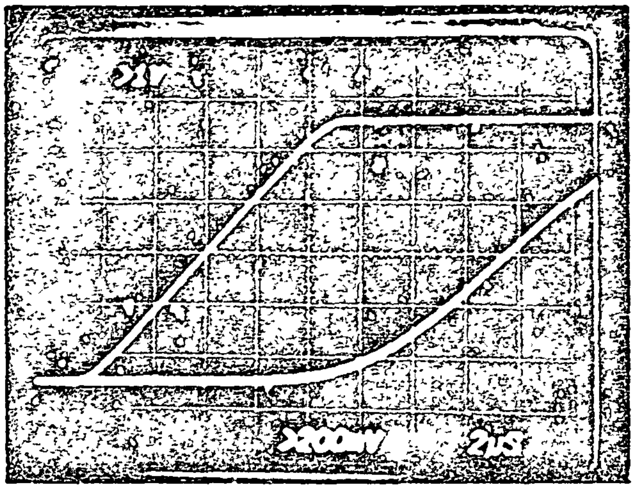


BAND: 2
CHANNEL: 12

DATE: 10-05-81

TIME: 12.0µS

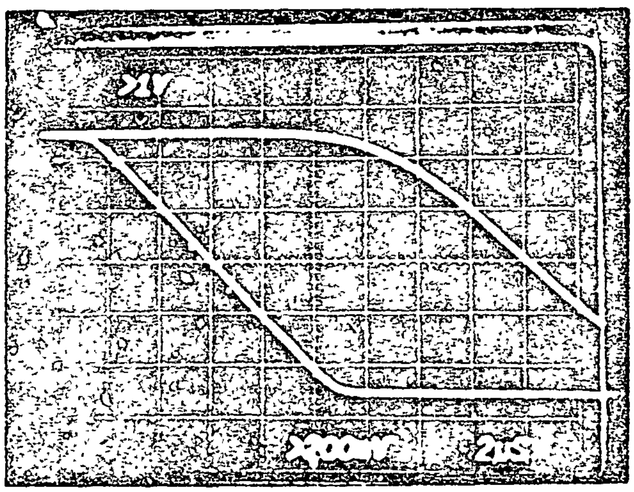
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 2
CHANNEL: 13

DATE: 10-05-81

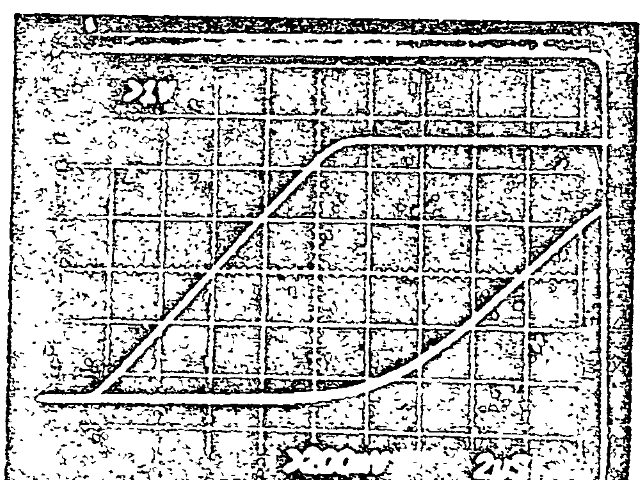
TIME: 11.6 μS



BAND: 2
CHANNEL: 13

DATE: 10-05-81

TIME: 12.2 μS



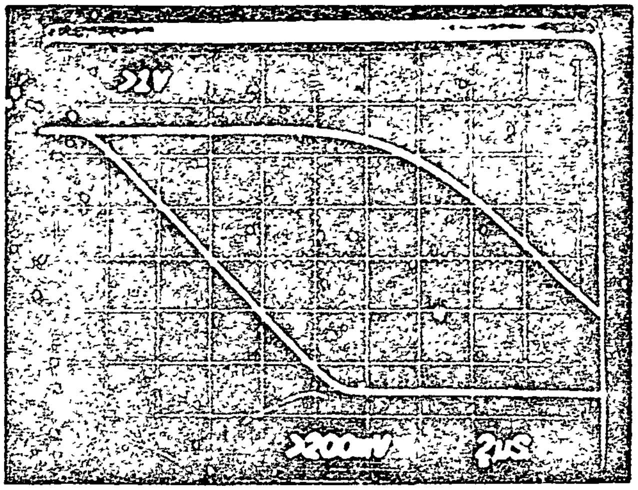
BAND: 2
CHANNEL: 14

DATE: 10-05-81

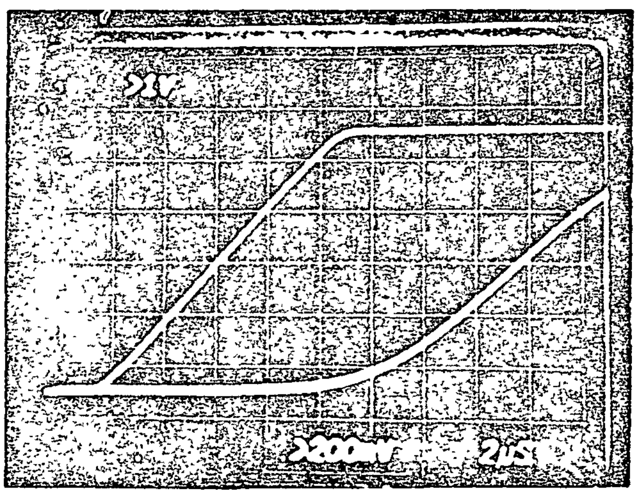
TIME: 11.8 μS

N. C. Davison, III

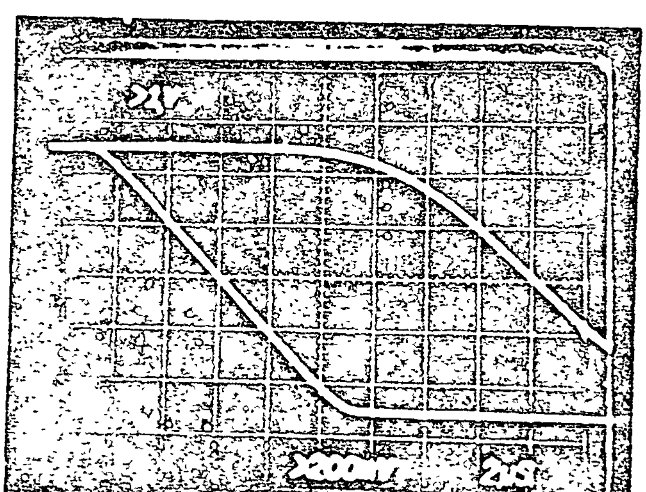
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 2
CHANNEL: 14
DATE: 10-05-81
TIME: 12.6μS

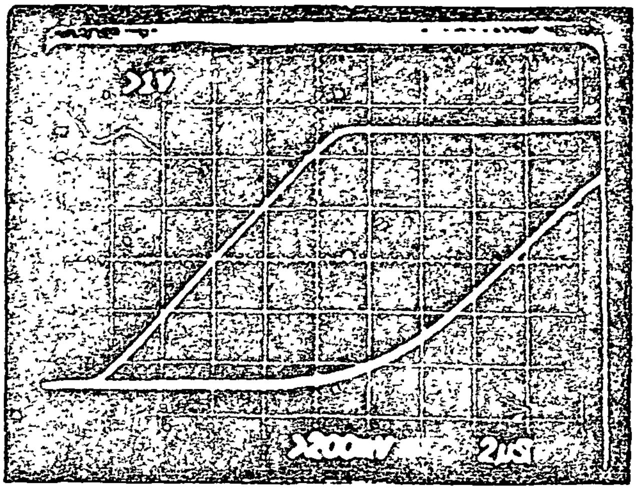


BAND: 2
CHANNEL: 15
DATE: 10-05-81
TIME: 11.6μS



BAND: 2
CHANNEL: 15
DATE: 10-05-81
TIME: 12.2μS

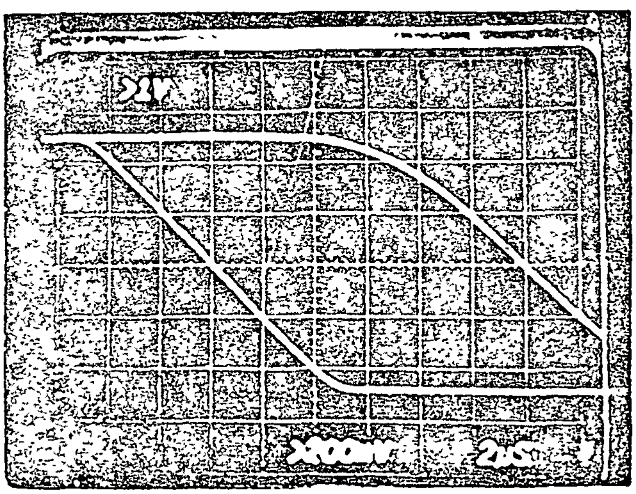
N. C. Davison, III



BAND: 2
CHANNEL: 16

DATE: 10-05-81

TIME: 11.4 µs



BAND: 2
CHANNEL: 16

DATE: 10-05-81

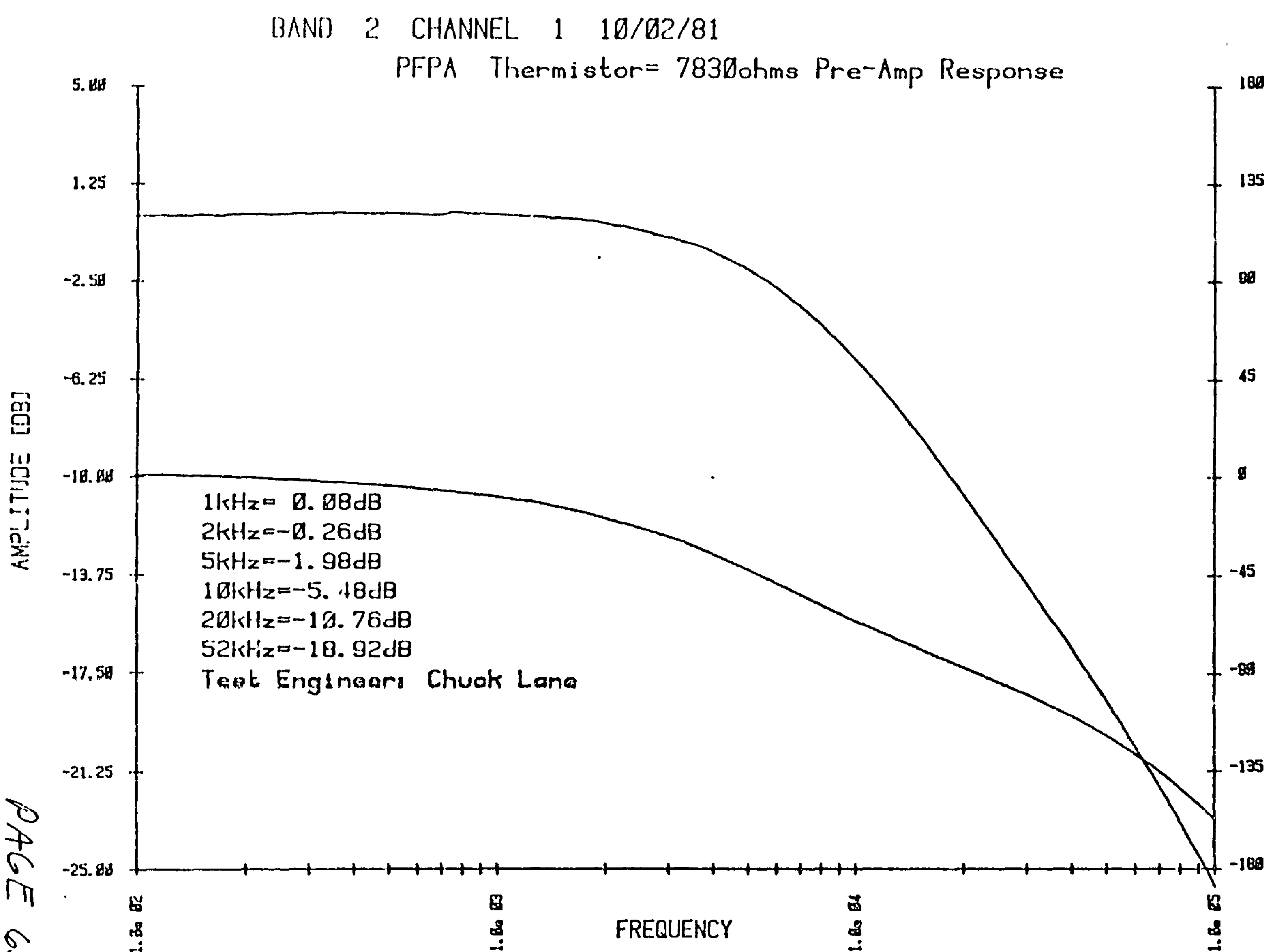
TIME: 11.8 µs

BAND:
CHANNEL:

DATE:

TIME:

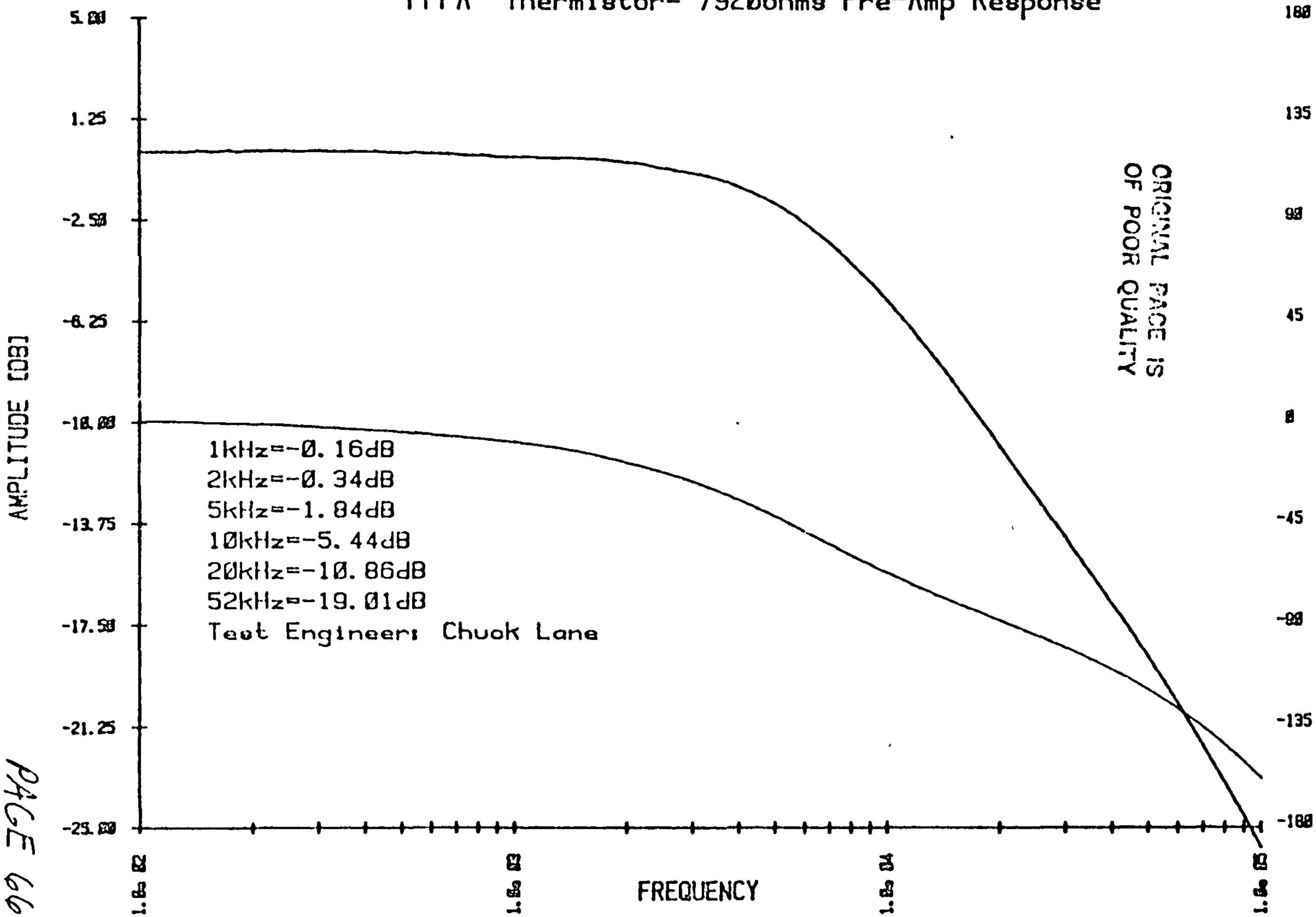
N. C. Davison III



ORIGINAL PAGE IS
OF POOR QUALITY

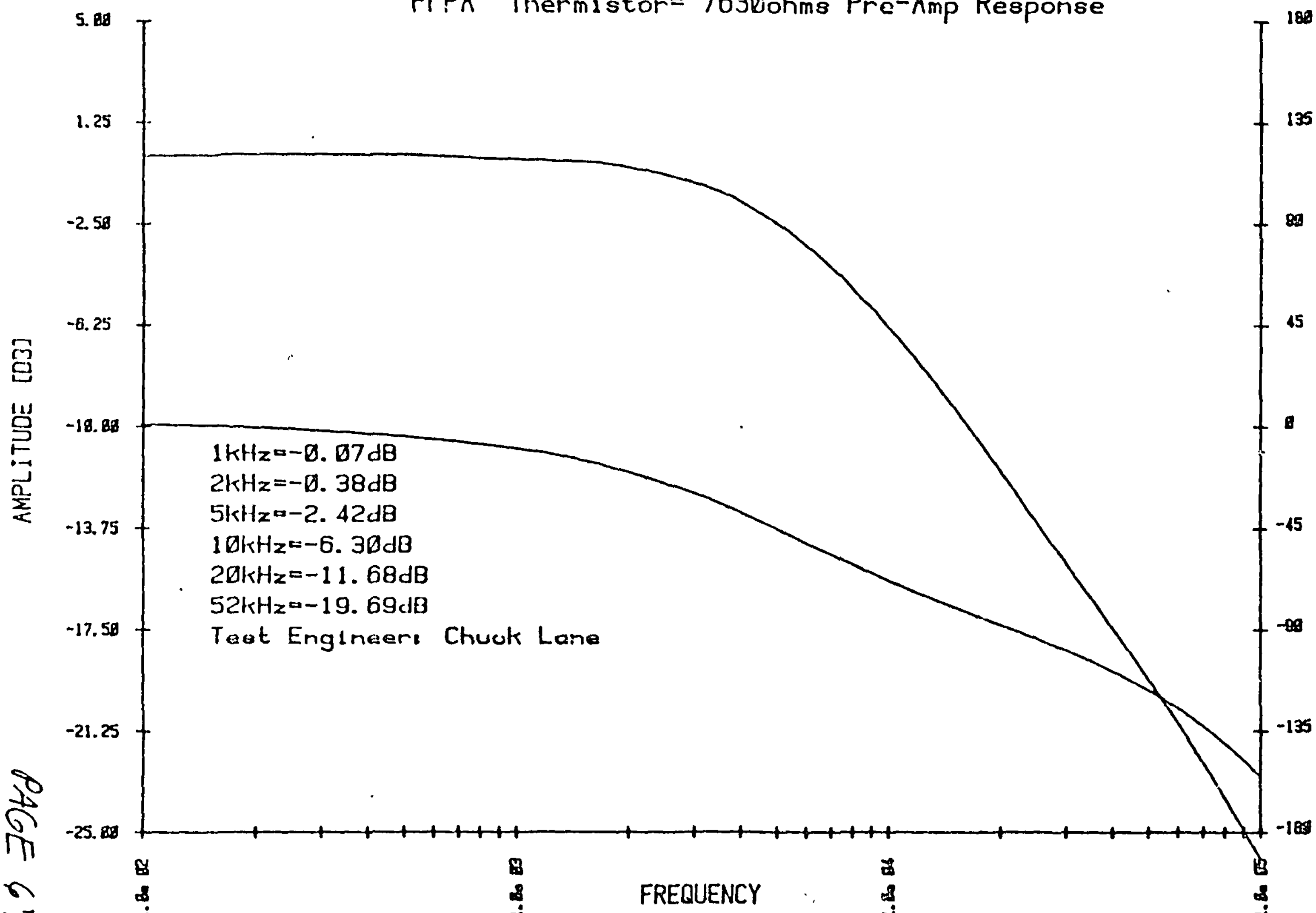
BAND 2 CHANNEL 2 10/01/81

PFPA Thermistor= 7920ohms Pre-Amp Response



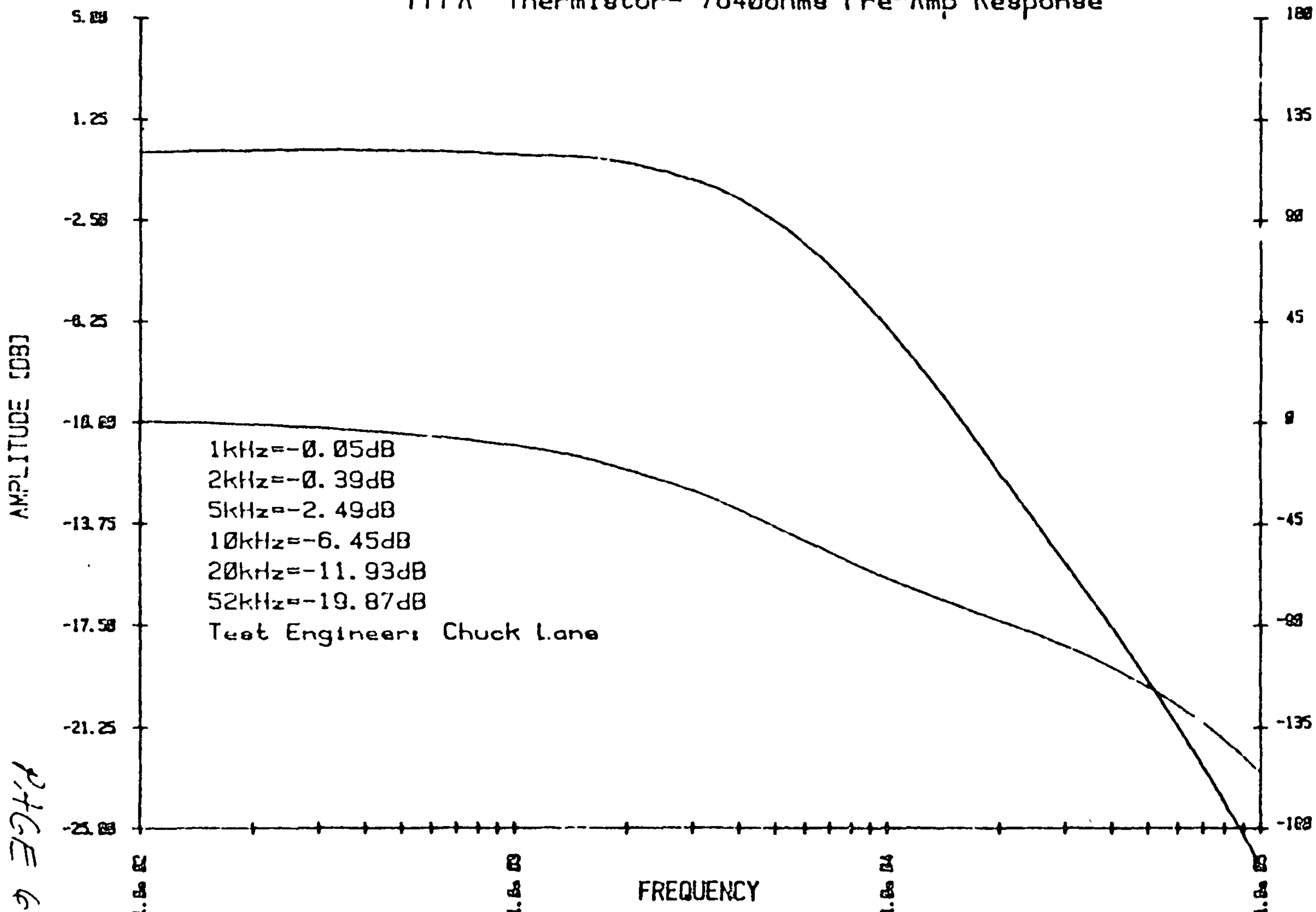
BAND 2 CHANNEL 3 10/02/81

PFPA Thermistor= 7630ohms Pre-Amp Response



BAND 2 CHANNEL 4 10/01/81

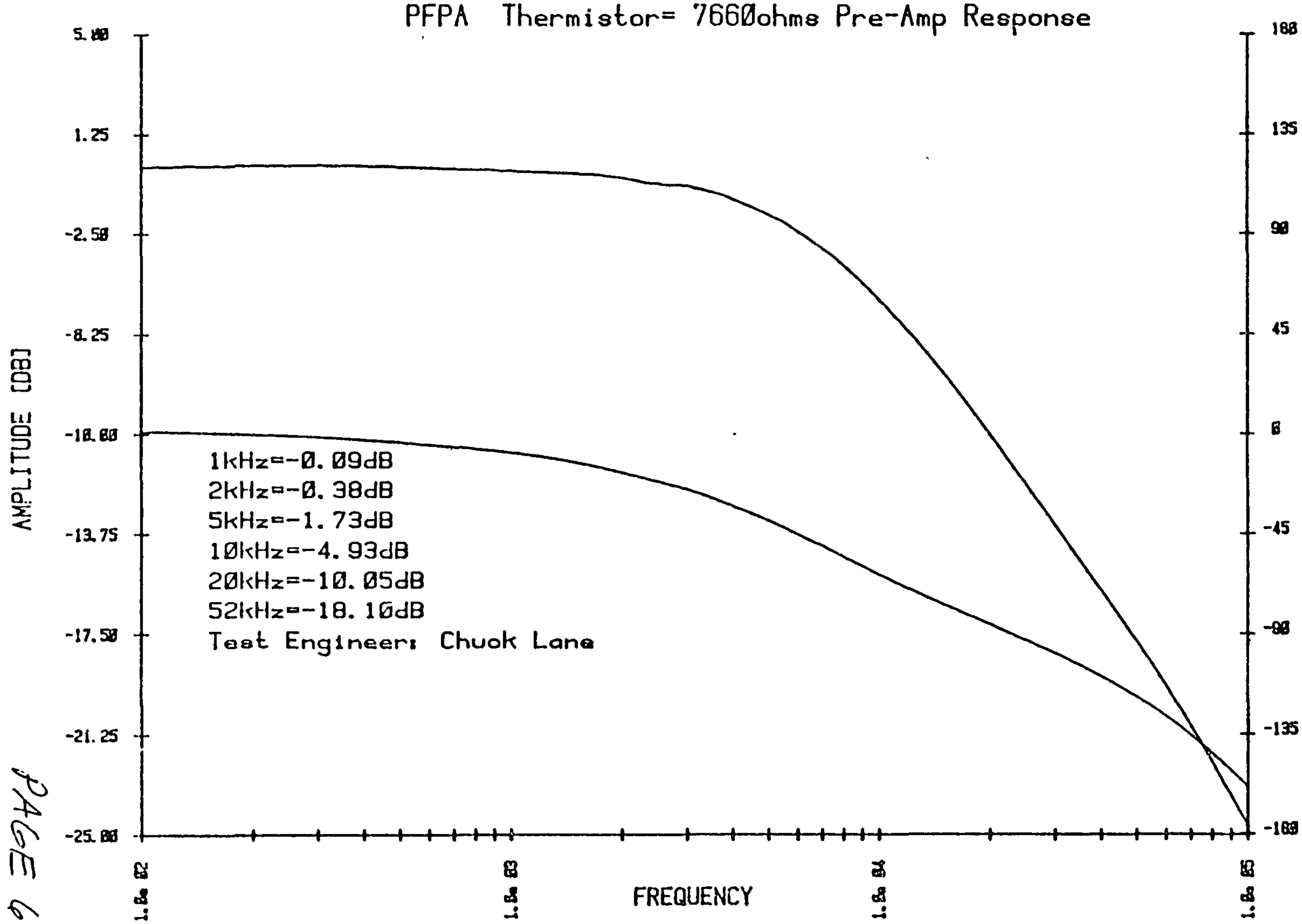
PFPA Thermistor= 7840ohms Pre-Amp Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 2 CHANNEL 5 10/02/81

PFPA Thermistor= 7660ohms Pre-Amp Response

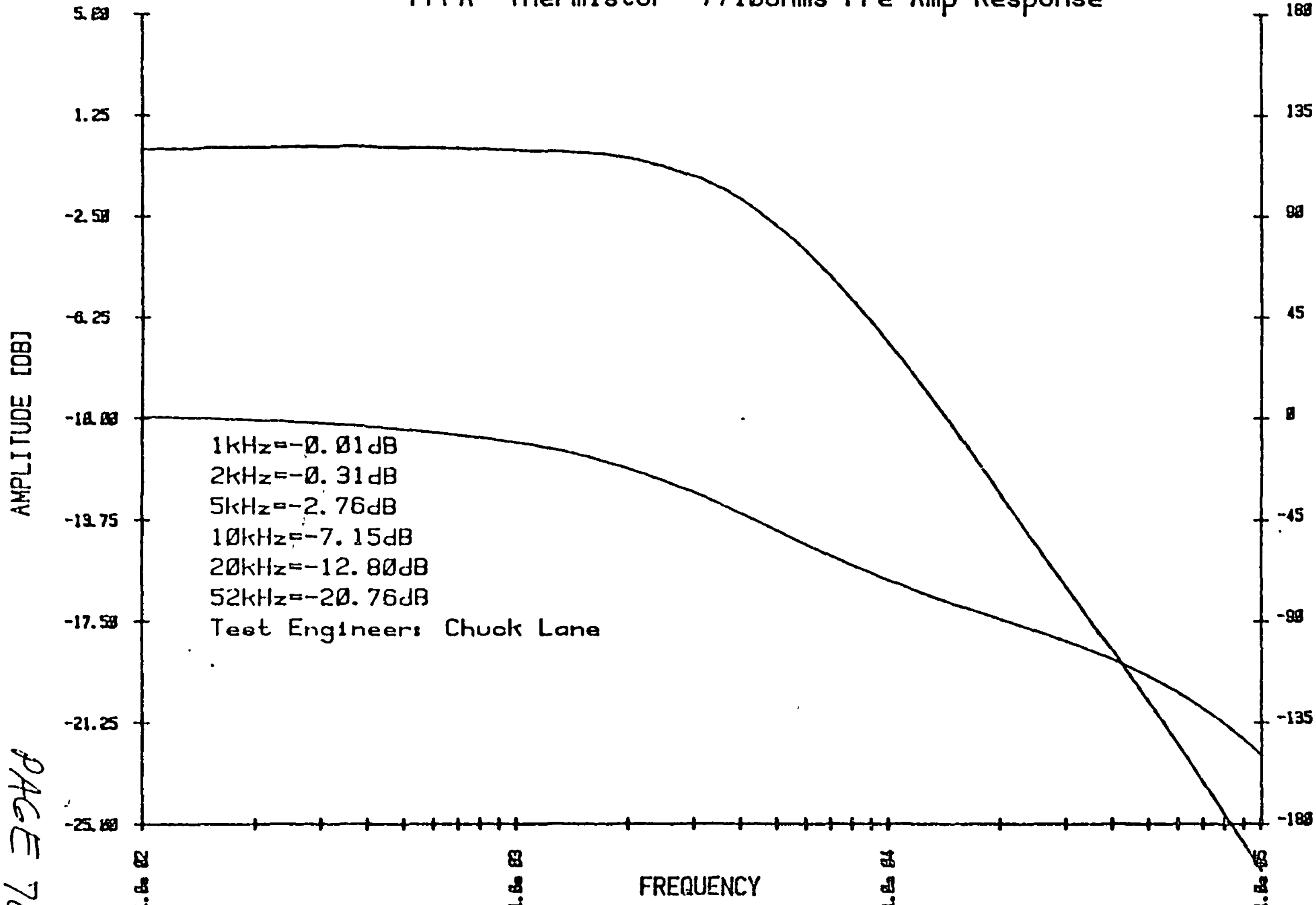


ORIGINAL PAGE IS
OF POOR QUALITY

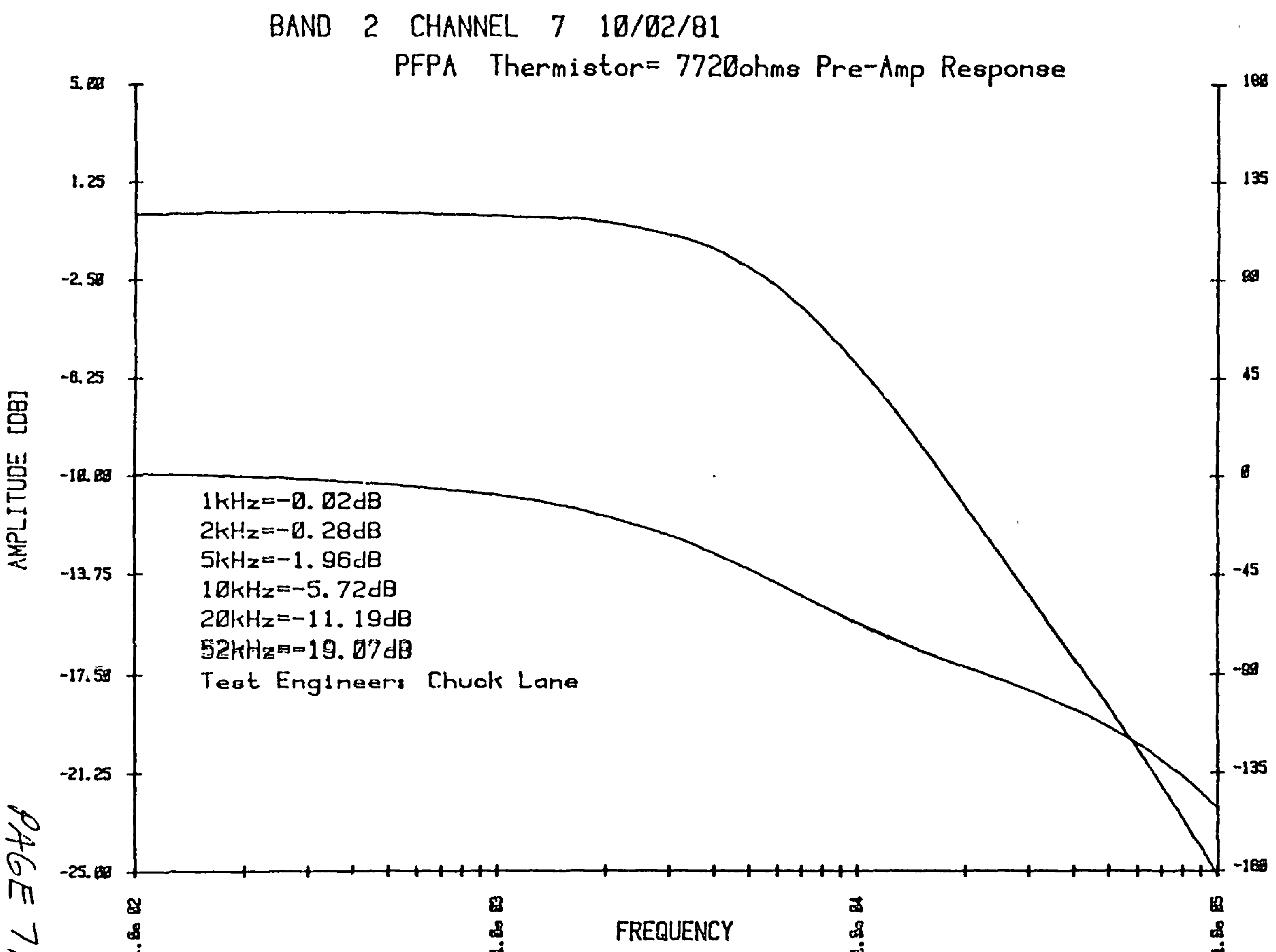
HEWLETT PACKARD

BAND 2 CHANNEL 6 10/01/81

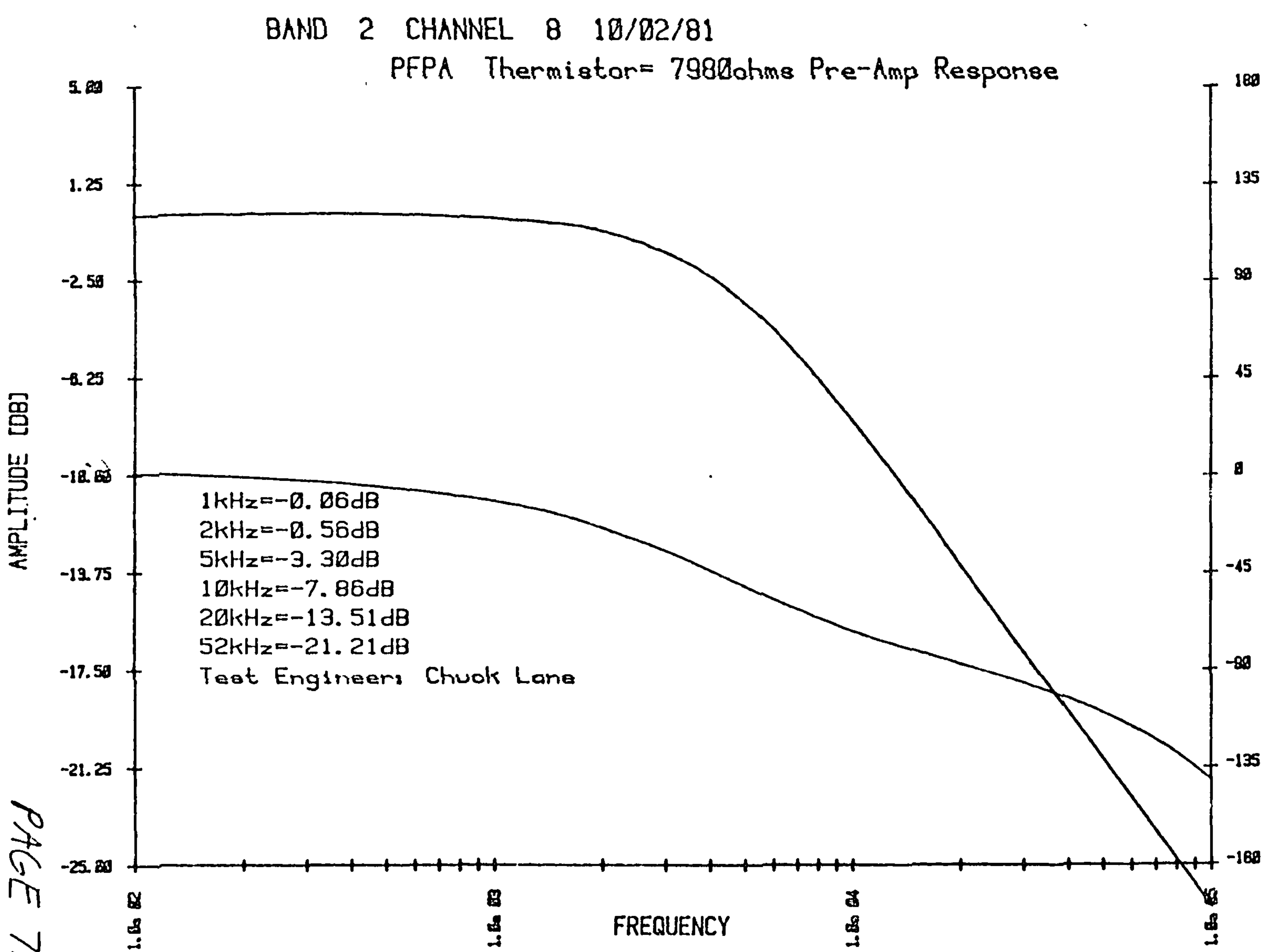
PFPA Thermistor= 7710ohms Pre-Amp Response



ORIGINAL PAGE IS
OF POOR QUALITY



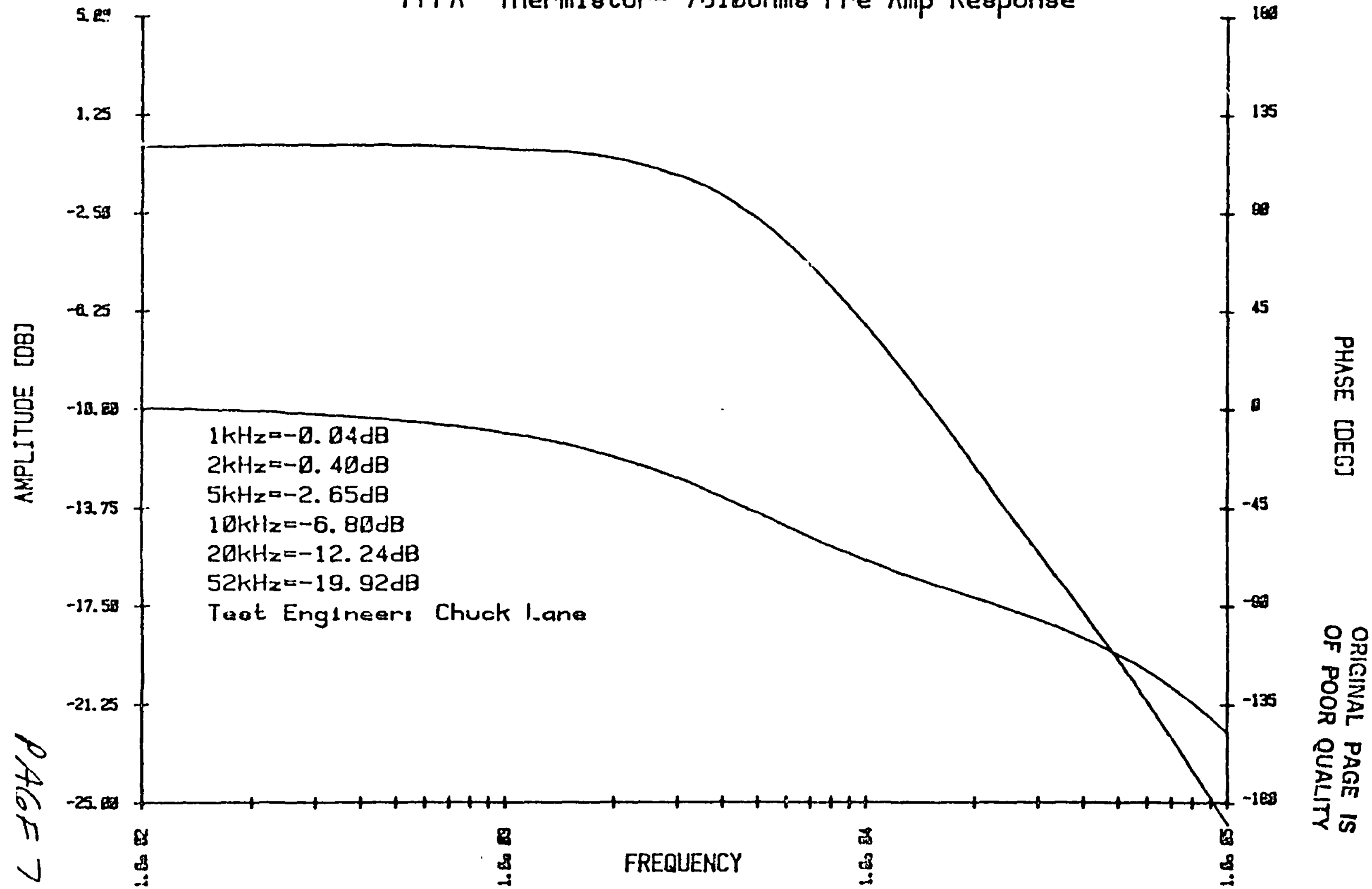
ORIGINAL PAGE IS
OF POOR QUALITY



BAND 2 CHANNEL 8 10/02/81
PFPA Thermistor= 7980ohms Pre-Amp Response
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
1kHz=-0.06dB
2kHz=-0.56dB
5kHz=-3.30dB
10kHz=-7.86dB
20kHz=-13.51dB
52kHz=-21.21dB
Test Engineer: Chuck Lane
1.0e 02
1.0e 03
1.0e 04
1.0e 05
FREQUENCY

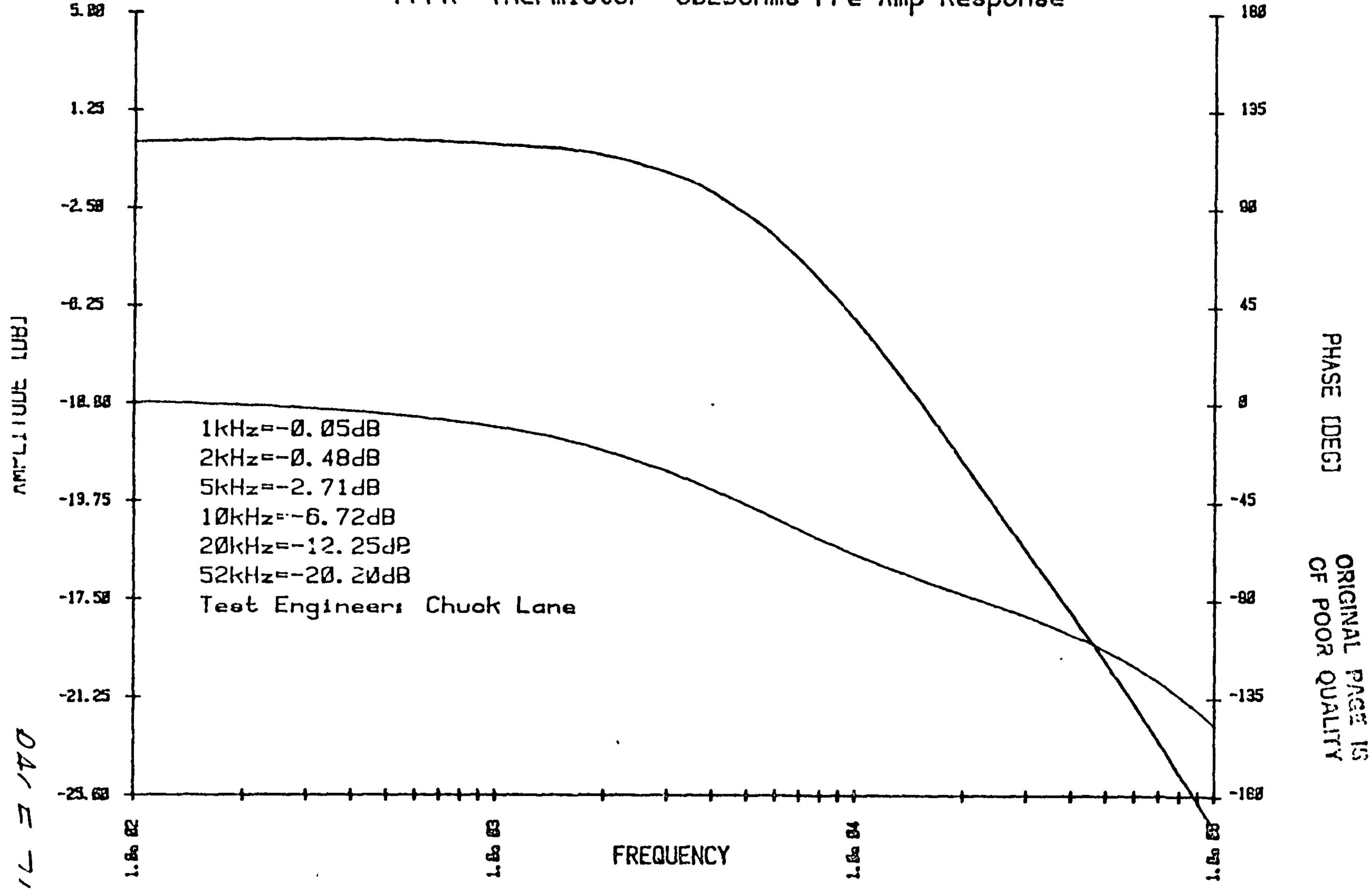
BAND 2 CHANNEL 9 10/02/81

PFPA Thermistor= 7810ohms Pre-Amp Response

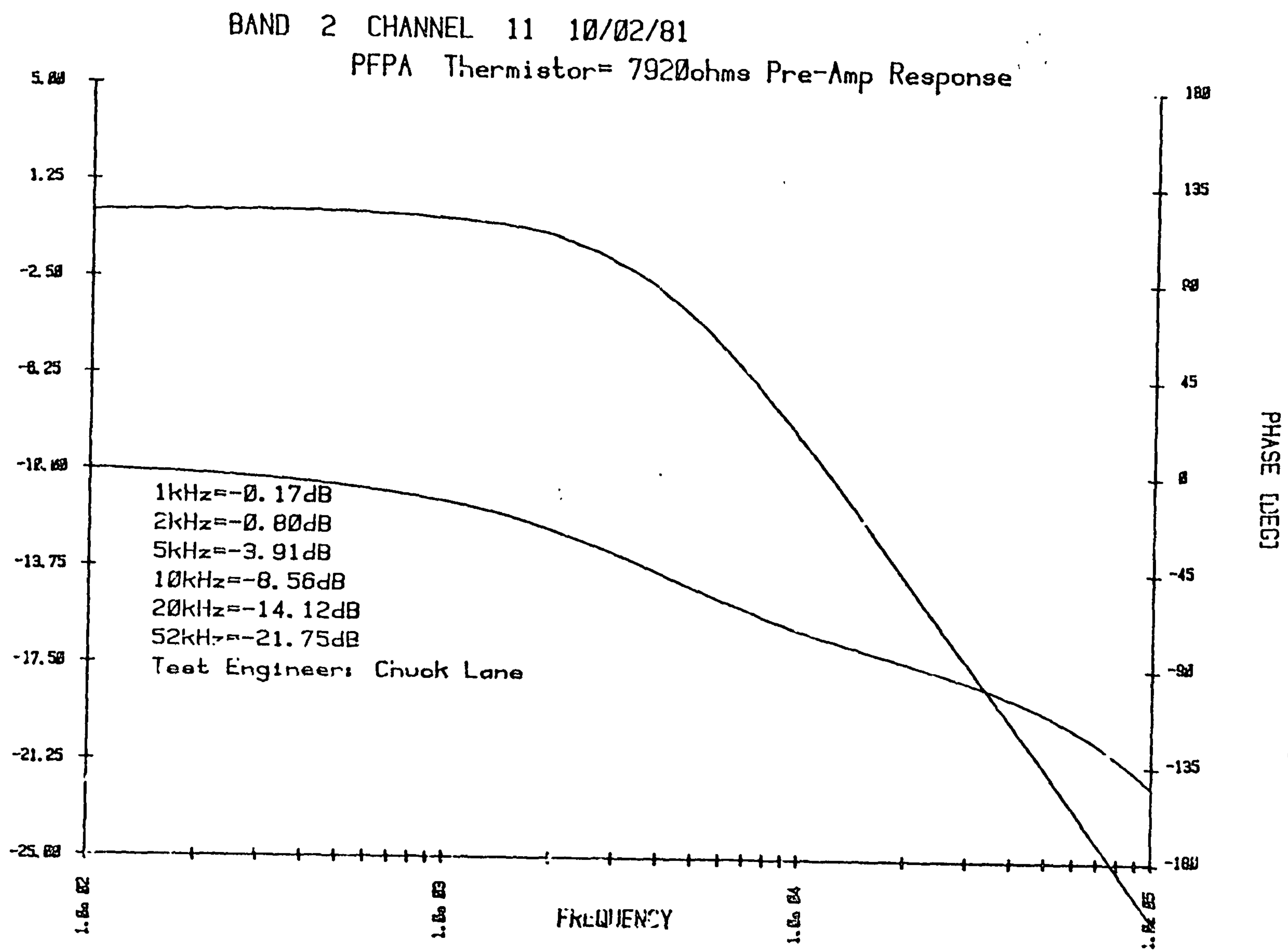


BAND 2 CHANNEL 1Ø 1Ø/Ø2/81

PFPA Thermistor= 8Ø2Øohms Pre-Amp Response

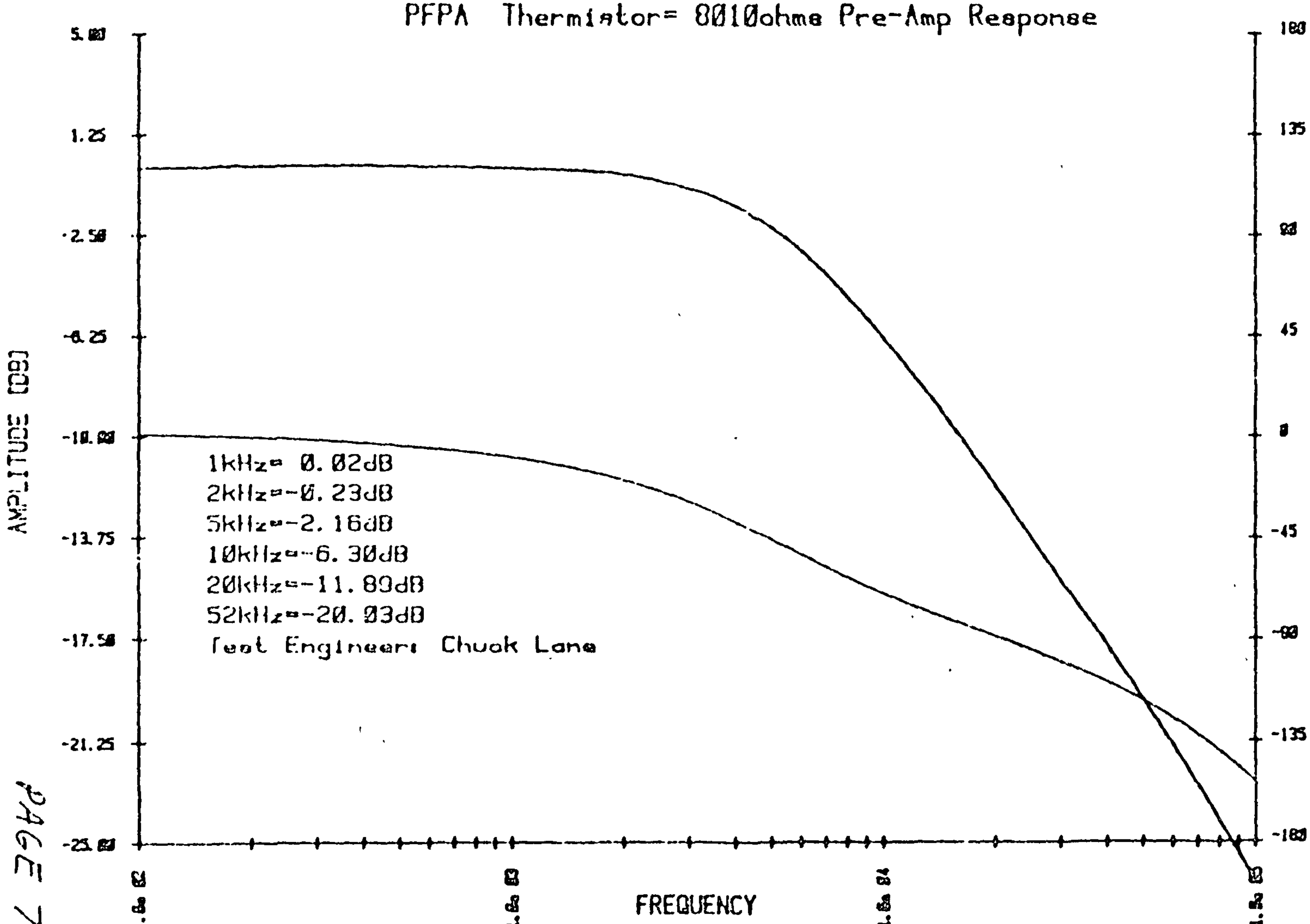


ORIGINAL PAGE IS
OF POOR QUALITY


HEWLETT PACKARD
BAND 2 CHANNEL 11 10/02/81
PFPA Thermistor= 7920ohms Pre-Amp Response
1kHz=-0.17dB
2kHz=-0.80dB
5kHz=-3.91dB
10kHz=-8.56dB
20kHz=-14.12dB
52kHz=-21.75dB
Test Engineer: Chuck Lane
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
180
135
90
45
0
-45
-90
-135
-180
PHASE [DEG]
FREQUENCY
1.0e 02
1.0e 03
1.0e 04
1.0e 05

BAND 2 CHANNEL 12 10/02/81

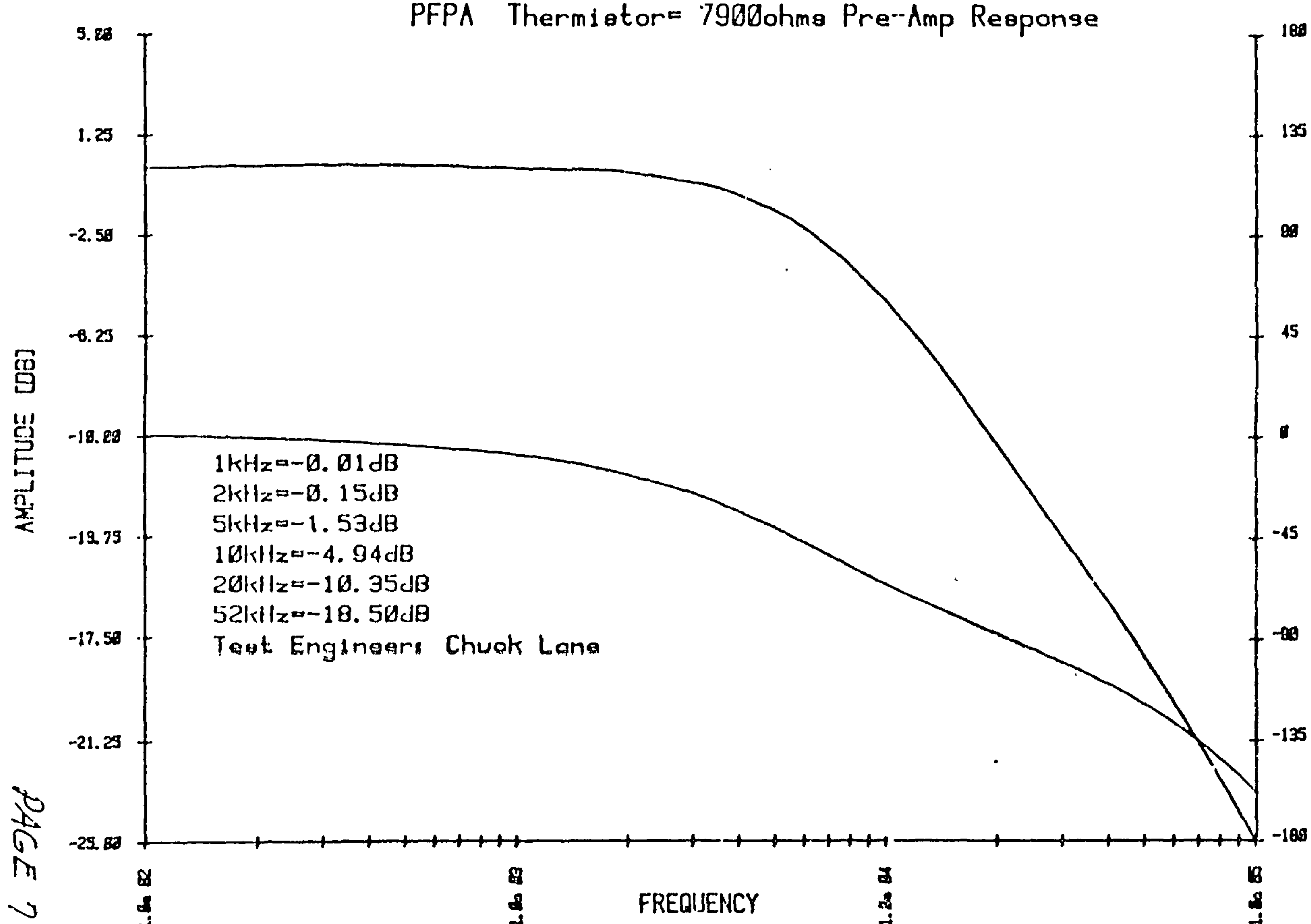
PFPA Thermistor= 8010ohms Pre-Amp Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 2 CHANNEL 13 10/02/81

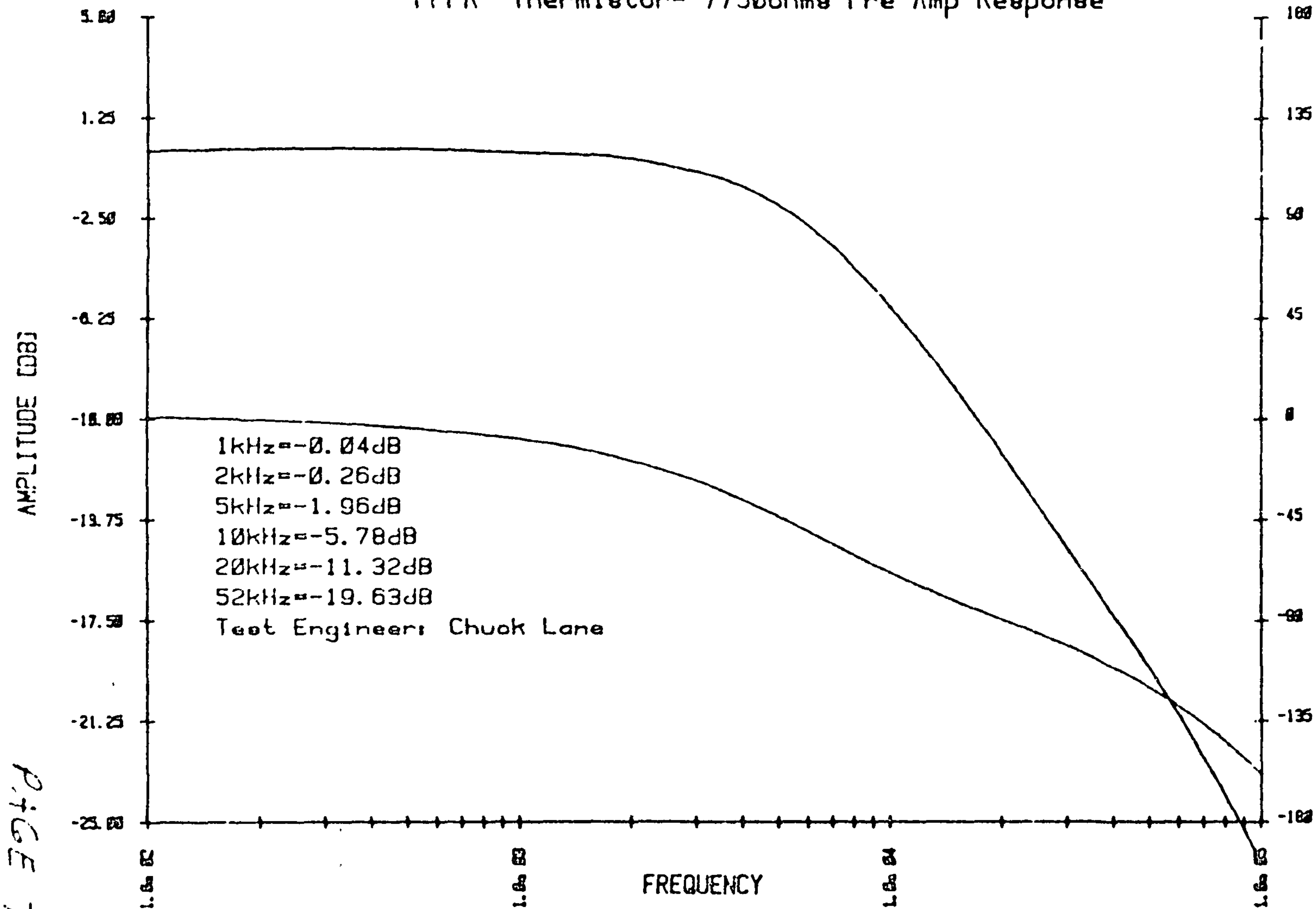
PFPA Thermistor= 7900ohms Pre-Amp Response



ORIGINAL PAGE IS OF POOR QUALITY

BAND 2 CHANNEL 14 10/02/81

PFPA Thermistor= 7750ohms Pre-Amp Response

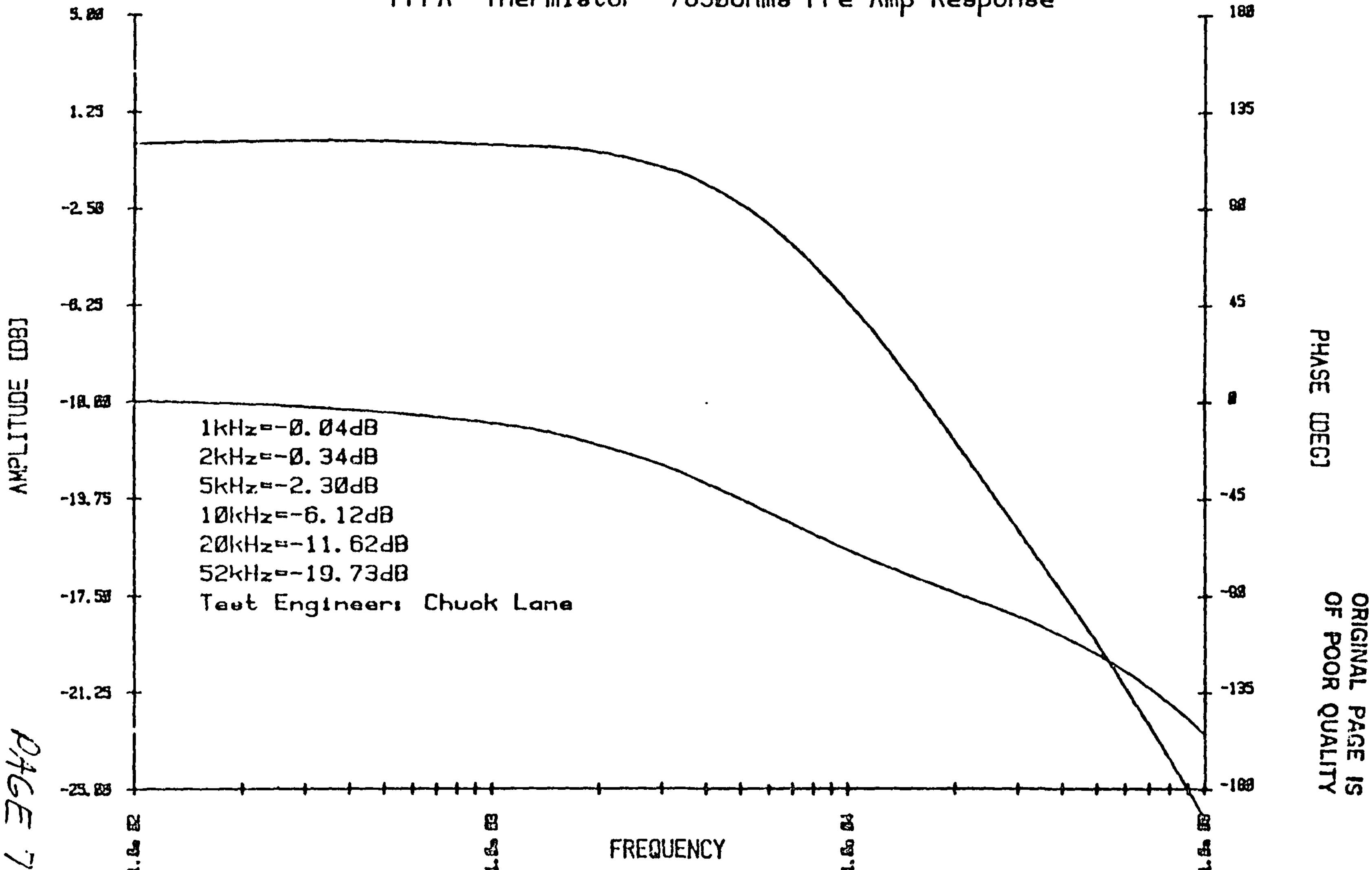


ORIGINAL PAGE IS OF POOR QUALITY

PAGE 75

BAND 2 CHANNEL 15 10/02/81

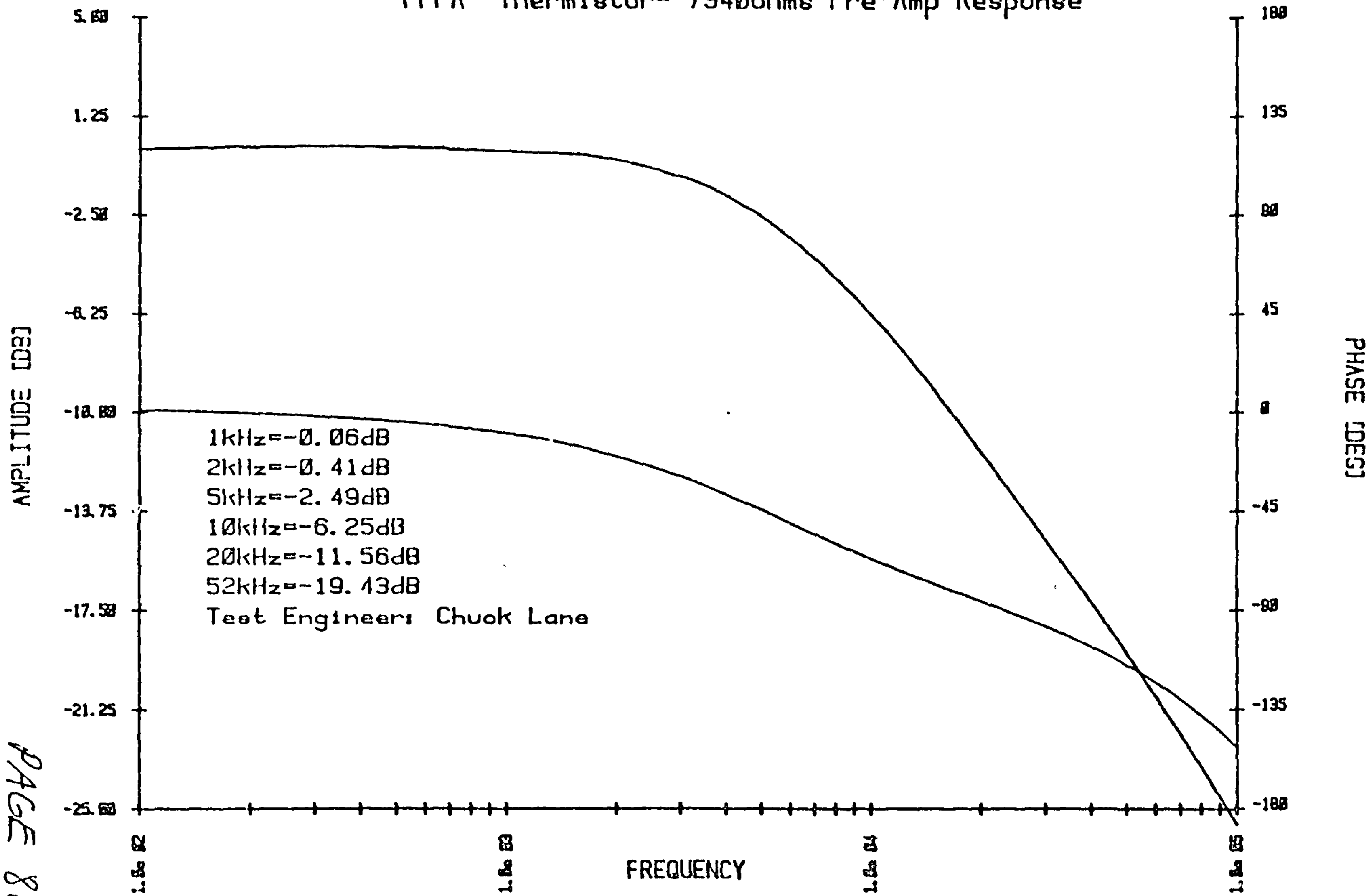
PFPA Thermistor= 7830ohms Pre-Amp Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 2 CHANNEL 16 10/02/81

PFPA Thermistor= 7940ohms Pre-Amp Response



ORIGINAL PAGE IS
OF POOR QUALITY

TM PFPA

FLIGHT BAND #3

S/N 401

8/28/81

INTRODUCTION

The following pages summarize the data obtained for the Band ~~4~~ CH 3 TM Flight Full Band Assembly (P/N 50797) as of August 28, 1981.

The enclosed data has been collected from half-band, post amplifier, and full-band acceptance test data records. It is presented here to make it available in a single package.

Neville C. Davison, III
FPA Test Supervisor

D. M. Randall
F.P.A. R.E.A.

ORIGINAL PAGE IS
OF POOR QUALITY

INDEX

FPA

SBRC ENGINEERING ORDER/~~REVISION NOTICE~~ NO. 3654A

CODE IDENT 11323

SHEET 1 OF 1

DRAWING TITLE TEST PROCEDURE, TM BANDS 1-4 SIGNAL CHANNEL ELECTRONICS	DRAWING NUMBER 16597-H

PROJECT NUMBER V011	ITEM DISPOSITION	CLASS CHANGE ☐ I ☒ II A	DRAWING TYPE ☐ A ☒ B
ACTIVITY 51065 W 003 & SUBO.	REWORK ☐ ITEMS CONFORM ☒ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	AUTHORIZING ECR NUMBER TM2449/01	

DESCRIPTION OF CHANGE

SECTION 4.5, TOP OF PAGE 11

WAS: LIMITS:

BAND 3: 2.49K TO 5.90K
BAND 4: 8.23K TO 100K

IS:

BAND 3: 2.49K TO 24.3K
BAND 4: 4.02K TO 100K

ORIGINAL PAGE IS
OF POOR QUALITY

REVISION STATUS THIS PRINT
NOT MAINTAINED AFTER
SEP 2 2 1981
DO NOT USE THIS PRINT
UNLESS YOUR ORDER OR INSTRUCTIONS
SPECIFY THE REVISION LEVEL SHOWN

★ NOTE AND/OR ITEM NUMBER TO BE ASSIGNED ~~AT TIME~~ OF INCORPORATION

DRAWN C. DAVISON	DATE 9/17/81	QUALITY APPROVAL	DATE 9/-/79	RELEASED BY	DATE
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY C.	DATE
NASA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	

FPA

SBRC ENGINEERING ORDER/REVISION NOTICE

CODE IDENT 11373

SHEET 1 OF 1

NO. 3442A

TITLE: TEST PROCEDURE, TM BANDS 2, 3 SIGNAL CHANNEL ELECTRONICS	DRAWING NUMBER: 16597-H

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
V011	REWORK ☐ ITEMS CONFORM ☒ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	I ☐ II ☒ A	A ☐ B ☒
EFFECTIVITY: S/N 003 & SUBQ.		AUTHORIZING ECR NUMBER: TM2427/01	

DESCRIPTION OF CHANGE

TOP OF PAGE, TEST DATA RECORD FOR "PREGAIN RESISTOR SELECTION (REF. SECTION 4.5)

WAS: LIMITS

BAND 2: 4.12K TO 11.8K
BAND 3: 2.61K TO 5.90K

IS: LIMITS

BAND 2: 3.01K TO 11.8K
BAND 3: 2.21K TO 12.7K

ORIGINAL PAGE IS OF POOR QUALITY

* NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION.

PREPARED BY	DATE	QUALITY APPROVAL	DATE	RELEASED BY	DATE
T. C. DAVISON	7/16/81	[illegible]	[illegible]	[illegible]	[illegible]
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
[illegible]	7/16/81				
REA/RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[illegible]	7/16/81				

REVISIONS

	SYM	DESCRIPTION	DATE	APPROVED	
	A	INITIALLY RELEASED 8-22-79			
51065 S/N [illegible] & UP	B	REPLACES REV A WITH CHANGE AS REQUESTED BY ECR TM1202/01 TO UPDATE TEST PROCEDURE	1-7-80	HJS	
51065 S/N 001 & UP	C	Incorporated TM1357/01.(1-6) See Revision Notice.	80-2-13	mm	
51065 S/N 002 & SUBQ	D	INCORPORATED TM1423/01 R1 AND TM1420/01. SEE REVISION NOTICE.	80-4-21		
51065 S/N 002 & SUBQ	E	Incorporated E.O. 9965 and E. O. 1684A.	80-11-19	BJM	
51065 S/N 003 & SUBQ	F	Incorporated E.O. 2068A.	80-11-19	BJM	
51065 SN 002 & SUBQ	G	INCORPORATED TM2220/01.(1) ADDED TO PARA 4.9. INCORPORATED EO'S 2972A & 2978A.	81-3-31	NCL	NCL
51065 S/N 003 & SUBQ	H	Incorporated E.O. 2769A	81-5-14	NCL	NCL

FINAL TEST. MAIN AHR NO. 50904-43
OPERATION 1300.
AUG. 28, 1981

FR8317
50797-01 #2600

REVISION STATUS THIS PRINT NOT MAINTAINED AFTER
JUL 16 1981
DO NOT USE THIS PRINT
UNLESS YOUR ORDER ... SPECIFY THE REVISION ...

ORIGINAL PAGE IS
OF POOR QUALITY

CONTRACT NO.	SANTA BARBARA RESEARCH CENTER
NAS 5-24200	A Subsidiary of Hughes Aircraft Company GOLETA, CALIFORNIA
1-2-80 1-2-80 1-3-80 1-7-80	TITLE TEST PROCEDURE, TM BANDS 1-4 SIGNAL CHANNEL ELECTRONICS

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE		SHEET 1 OF 20

ORIGINAL PAGE IS
OF POOR QUALITY

1.0 SCOPE

This document describes the functional test of the Silicon Detector and Preamplifier Assembly, 50797, and the Post-amplifier Circuit Board for Bands 1-4, 50904. Together these make up 16 complete channels, or one spectral band, of TM signal electronics. In preparation for the test, the 50797 assembly is mounted in the 75729 bonding and test fixture. A modulated LED is focussed on each individual detector. The postamp boost and rolloff resistors are set for each channel to provide proper frequency response from 100 Hz to 52 kHz and transient response to a 10 µs ramp. Wideband noise is measured for each channel. Crosstalk is measured from each channel to all other channels at 50 kHz. Once a preamp and postamp assembly are tested together, it is intended that they be installed in the same band location in the TM instrument.

2.0 APPLICABLE DOCUMENTS

2.1 SBRC Documents

The following documents specify the electrical assembly design and are for use in identifying details necessary in testing.

Drawings

50797	Silicon Detector & Preamplifier Assembly
50805	Electronic Diagram, Silicon Detectors & Preamplifiers
50904	PWB Assembly, Postamplifier, Band 1-4
52732	Parts, Electronics Select, TM
50905	Elec. Diagram, Postamplifier, Band 1-4
75918	Detector Array Alignment Fixture Assembly
76600	Full Band Test Set
76601	Voltage to Current Converter
76602	Optical Fiber

ORIGINAL PAGE IS OF POOR QUALITY

3.0 TEST EQUIPMENT REQUIRED (OR EQUIVALENT)

3.1 Full Band Test Set, SBRC Drawing 76600

The test set contains connectors to mate with the Detector and Preamplifier Assembly, a connector to accept the post-amplifier circuit board, a selector switch to monitor preamp and postamp outputs and potentiometers for adjusting the boost and rolloff resistance.

3.2 Oscilloscope

Tektronix type 547 oscilloscope with a 1 A7A plug-in, or equivalent.

3.4 Wave Analyzer

Hewlett Packard 3591A selective voltmeter, or equivalent, is used to measure crosstalk.

3.5 True RMS Voltmeter

Hewlett Packard 3400A, or equivalent, to measure frequency response and wideband noise.

3.6 Detector Array Alignment Fixture Assembly, SBRC Dwg. 75918

This assembly contains a microscope with a photometric eye-piece which allows the light from an optical fiber to be focussed onto an individual detector element.

3.7 Optical Fiber, SBRC Dwg. 76602

An optical fiber about 2 feet long is used between the light emitting diode (LED) and the alignment fixture assembly so the LED drive signal current will not be picked up by the high impedance focal plane circuitry.

3.8 Light Emitting Diode

Laser Diode Laboratories, type 639AS3831.

3.9 Voltage-to-Current Converter, SBRC Dwg. 76601

This box drives the LED with a current proportional to its voltage input.

ORIGINAL PAGE IS
OF POOR QUALITY

3.10 Function Generator

Wavetek type 147 drives the voltage-to-current converter for the frequency response and crosstalk tests.

3.11 Pulse Generator

Data pulse type 116 drives the voltage to current converter for the transient response test.

3.12 Integrator/Averager

PAR type 162 is used to improve the signal to noise ratio during the transient response test. The model 164 gated integrator plug-in is used.

3.13 Plotter

Hewlett Packard type 7044A is used with the Integrator/Averager.

3.14 Automatic Equipment

The following equipment is used when testing is performed in other than the manual mode.

3.14.1 Network Analyzer - The HP 3042 Network Analyzer consists of a 3308B Synthesizer, 3570A Network Analyzer and a 9825S Desk Top Computer.

4.0 PROCEDURE

4.1 Inspection

Check to see that nominal component values have been installed on the postamp board at C33-48, R1-16, R17-32, R33-48, R65-80 and R81-96. The nominal values are shown on the postamp assembly drawing 50904 as a function of the intended band number (1-4). The assembly drawing also gives a 52732 Select List Dash Number for each select component also as a function of intended spectral band. The final selected value must be chosen from the values in the list.

4.2 Setup

Attach the 50797 Detector Preamplifier Assembly (mounted in the bonding and test fixture) to the baseplate of the Detector Array Alignment fixture. Focus the microscope on detector element number 1 of 16. Connect the sinewave generator, voltage-to-current converter, LED and optical fiber. Locate the LED as far as possible from the detector-preamp assembly. Insert the postamp board into the test set socket.

4.3 Supply Current

ORIGINAL PAGE IS OF POOR QUALITY

Apply +21V ±0.5V to the test set following the indicated polarity. Limit the currents to 200 mA. Turn on the supply and record the currents as indicated on the supply meters.

4.4 Offset Adjustment

Connect the test set postamplifier high and low outputs to the + and - inputs of the oscilloscope preamplifier. Adjust the nominal 20 KΩ offset resistor in each channel to produce a differential offset voltage, $V_{OH} - V_{OL}$, of 0 ± 1V. Record the offset voltage and resistor value. The focal plane assembly must be dark for this test.

4.5 Low Frequency Gain Adjustment

Connect the true-reading rms voltmeter to the oscilloscope preamplifier output. Adjust the sinewave generator to produce a 4 v ± 1 v pk-pk 100 Hz undistorted sinewave on the scope. In each band select the channel whose feedback resistor is closest to the nominal value (1.0 X 10^9 ohms). Adjust the pre-gain resistors on the postamp board so that the gain value for each of the other channels matches that of the selected channel ± 5%. Resistors are to be replaced at the conclusion of this test. Record the final resistor values.

NOTE: When testing Band 4 only, postamp board resistors R33 through R48 (Post-gain resistors) must be lifted from the circuit board at one end. Otherwise a 4V pk-pk signal will not be attainable. Resistors are to remain lifted throughout the remainder of this test.

4.6 Frequency and Transient Response Adjustment

Measure the response to a 10 us ramp using the pulse generator, voltage-to-current converter, light emitting diode, optical fiber and microscope. Adjust the boost control on the test box for flattest response in the 30 to 500 us region after the ramp. Now reconnect the function generator and set the rolloff control on the test box for -3.0 db at 52 kHz. These controls are interactive so several iterations may be required.

The final setting should result in the transient response reaching final value within 1% after 60µS and within 1.5% after 35uS. Record the maximum overshoot (limit = 10%) and the 2 to 98% risetime (limit = 20µS). The frequency response should be -(3 +0/0-0.5) dB at 52 kHz. Record the boosted frequency response on the data sheet for the boost and rolloff settings obtained. Plot the transient response using the Integrator/Averager and the plotter.

It may be necessary to add capacitance at C33-C48 to meet the requirement. If capacitance is added, record the values on the data sheet. If no capacitor is required, enter 0 for value and make note that capacitor was not needed.

4.7 Wideband Noise

With the boost and rolloff set as in paragraph 4.6, measure the wideband noise on the true rms meter. It shall be less than (2.4 pA) (Rf) where Rf is the feedback resistor value in the channel being tested. Record the noise on the data sheet.

4.8 Crosstalk - Using the wave analyzer at the 1A7A signal output and the sinewave light source driver with the voltage-to-current converter, measure the crosstalk from each channel to its four nearest neighbors at 50 kHz. (Channel 1 has only 2 nearest neighbors: 2 and 3. Channel 2 has 3: 1, 3 and 4. Channel 3 has 4: 1, 2, 4, and 5. Also record the average crosstalk from each channel to its 11 non-neighbors. The measured crosstalk shall be less than 1% (-40 dB) for nearest neighbors and less than 0.1% (-60 dB) for non-neighbors.

4.9 Ground Continuity and Isolation

Turn off power. Remove connectors. Measure <11 ohms between J1-16 and:

J1-27	J2-6
J1-23	J2-10
J1-1	J2-31
J1-6	J2-27

Record maximum reading of Data Sheet.

Measure >1 MΩ between J1-16 and

J1-18	J2-15
J1-11	J2-21

Check Data Sheet O.K.

Measure >1 MΩ between J1-16 and the FPA aluminum mounting fixture.

Check Data Sheet O.K.

Measure <25Ω between J1-16 of odd channels and J1-16 of even channels for Bands 1, 2, 3 and 4. Check data sheet O.K.

4.10 <u>Time Delay</u>

Measure the Time Dealy between the 50% points of the led drive current waveform transition and the corresponding channel output waveform transition. Display both waveforms on the oscilloscope, using a dual trace plug-in with external sync and 2µS/CM sweep time. Photograph the rise and fall separetely for each channel. Record the delays on the Data Sheet. They shall be TBD ±0.5µS.

5.0 QUALITY ASSURANCE PROVISIONS

ORIGINAL PAGE IS
OF POOR QUALITY

5.1 Notification of QA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by QA Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All Flight Assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

5.4 Failures

Problems/failures encountered during testing of flight hardware shall be handled in accordance with Thematic Mapper Product Effectiveness Plan HS236-0066A.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer, QA Engineer, and Design Engineer. When the QA Engineer has not witnessed the test, he should sign the data sheet after it is reviewed by the Design Engineer. A typical data sheet format is included at the end of this procedure.

6.2 Distribution of Test Records

After the test data sheet is signed, place one (1) copy in the traveling file, one(1)copy and the original in the Engineering file, and give one (1) copy to QA.

TEST DATA RECORD

ORIGINAL PAGE IS OF POOR QUALITY

Detector Preamplifier Assembly 50797, S/N 401 contains 51015 assemblies S/N 207 and 208-1, odd and even channels, respectively.

Postamplifier Circuit Board Assembly 50904, S/N 201
Intended for TM Spectral Band ~~FOUR~~ 3 110
Feedback Resistor values from data sheets for specification 16306.

ODD		Even	
1	.93	2	1.05
3	.92	4	.96
5	.84	6	.95
7	.88	8	.98
9	.90	10	.98
11	.90	12	.88
13	.90	14	.98
15	.85	16	.96

4.3 Power Supply Current
Limits 200mA
+ 21V 140 mA
- 21V 160 mA

Test Engineer [signature] Date Aug 25, 1981

Test Supervisor [signature] III Date AUG. 26, 1981

Quality Control Stamp [signature] 18 Date 8-26-81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV —	SHEET 9

4.4

ORIGINAL PAGE IS OF POOR QUALITY

Channel	Resistor	Value	908600-( )	Measured Offset Voltage	Limit: 0.0 ± 1.0 V
1	R17	19.1 K	249	-1.1 V	*
2	R25	21.5	254	-0.2	
3	R18	17.8	246	-0.9	
4	R26	20.0	251	-1.0	
5	R19	19.1	249	-0.6	
6	R27	21.0	253	-0.6	
7	R20	23.7	258	-1.2	*
8	R28	18.7	248	+1.2	*
9	R21	21.5	254	-0.9	
10	R29	21.0	253	-0.3	
11	R22	21.5	254	-0.9	
12	R30	18.7	254	-0.7	
13	R23	20.5	252	-1.5	*
14	R31	20.5	252	-0.5	
15	R24	20.0	251	-1.3	*
16	R32	20.0	251	-0.5	

Test Engineer ____________ Date Aug 25, 1981

Test Supervisor ____________ III Date AUG. 27, 1981

Quality Control Stamp ____________ Date 8-27-81

I 118 CANCEL ACCEPTANCE DUE TO OUT OF SPEC CONDITION

H 1212 10-9-81 CH 1, 7, 8, 13, 15 OUT OF SPEC

PHR

SEE FR #325

* OUT OF SPEC 10-9-81

I 110

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV //	SHEET 10

ORIGINAL PAGE IS
OF POOR QUALITY

4.5 Pregain Resistors

LIMITS:

Band 1: 4.87K to 16.2K
2: 4.12K to 11.8K
~~3: 2.61K to 5.90K~~ 2.49K to 243K per E.O. 3654A
4: 8.25K to 10CK

Channel	Resistor Value	908600-( )
1	R81 12.7 K	-232
2	R89 22.1 K	-255
3	R82 12.1 K	-230
4	R90 16.2 K	-242
5	R83 10.0 K	-222
6	R91 16.2 K	-242
7	R84 12.1 K	-230
8	R92 16.2 K	-242
9	R85 12.7 K	-232
10	R93 17.4 K	-245
11	R86 12.7 K	-232
12	R94 11.5 K	-228
13	R87 12.1 K	-230
14	R95 17.4 K	-245
15	R88 10.5 K	-224
16	R96 16.2 K	-242

I 110 10/7/81

Test Engineer [signature] Date 8/25/81

Test Supervisor [signature] III Date AUG. 27, 1981

Quality Control Stamp [signature] Date 8-27-81

I 18

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 11

FORM NO 0123 DIETERICH-POST CLEARPRINT 1000H

4.6 Transient Response

Maximum excursion from final value after time t_0 + t where t_0 is the time when the response reaches 2% of final value.

	t = ~~95μs~~ 30μs BMR Limit = 1.5%	t + 60μS Limit = 1.0%
Ch 1	2.0 %*	.2 %
2	2.0 *	.1
3	1.8 *	0
4	2.4 *	.2
5	1.0	0
6	1.8 *	0
7	1.2	.1
8	2.6 *	.2
9	1.5	.2
10	2.6 *	.4
11	1.5	0
12	1.8 *	.5
13	1.5	1.0
14	2.0 *	.2
15	2.0 *	.2
16	2.0 *	.4

Test Engineer C. R Lane Date Aug. 27, 1981

Test Supervisor [signature] III Date Aug. 27, 1981

Quality Control Stamp H 1212 PG Ryan Date 10-21-81

*SEE FR S 8317
AND AUTHORIZATION TO
MOVE NONCOMPLIANT HARDWARE,
AND MEMO HS236-7677

COPIES OF ALL ARE IN
SD791 S/N 401 BAND 7 BOOK

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 12

OVERSHOOT	Ch.		RISETIME	Ch.	
	1	3%		1	12
	2	6%		2	12µs
	3	7%		3	12µs
	4	4%		4	12µs
	5	5%		5	12µs
	6	3%		6	12µs
	7	5%		7	12µs
	8	4%		8	12µs
	9	4%		9	12µs
	10	2%		10	12µs
	11	4%		11	12µs
	12	5%		12	12µs
	13	3%		13	12µs
	14	4%		14	12µs
	15	5%		15	12µs
	16	3%		16	12µs

Limit: 10 % Limit: 20 µsec

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer [signature] Date Aug 27, 1981

Test Supervisor [signature] Date AUG. 27, 1981

Quality Control Stamp [signature] Date Aug. 27, 1981

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 13

ORIGINAL PAGE IS
OF POOR QUALITY

4.6 Boosted Frequency Response:

	100Hz	1 kHz	2 kHz	5 kHz
Limits (dB)	0	±0.5	±0.5	±0.5
Ch 1	0.0 db	+.1 db	+.1 db	0.0 db
2	0.0	+.1	+.1	+.1
3	0.0	+.1	+.1	+.1
4	0.0	+.1	+.1	0.0
5	0.0	+.1	+.1	+.1
6	0.0	+.1	0.0	0.0
7	0.0	+.1	+.1	+.1
8	0.0	+.1	+.1	-.1
9	0.0	+0.1	+.1	0.0
10	0.0	+.1	0.0	0.0
11	0.0	+.1	+.1	0.0
12	0.0	+.1	+.1	0.0
13	0.0	+.1	+.1	+.1
14	0.0	+.1	+.1	+.1
15	0.0	+.1	+.1	0.0
16	0.0	+.1	+.1	0.0

Test Engineer [signature] Date 8/25/81

Test Supervisor [signature] III Date AUG. 27, 1981

Quality Control Stamp J. Weinkauf [stamp] Date Aug. 27, 1981

imits (dB)	10 kHz +0.4 -0.6		20 kHz +0.4 -0.6		52 kHz -(3 +0/-0.5)	
Ch 1	-.3	db	-.6	db	-2.9	db
2	-.1		0.0		-2.8	
3	0.0		0.0		-2.8	
4	-.2		-.3		-3.0	
5	-.1		-.2		-2.8	
6	-.3		-.6		-3.0	
7	0.0		-.1		-3.0	
8	-.3		-.4		-3.0	
9	-.1		-.3		-2.7	
10	-.4		-.6		-3.0	
11	-.2		-.4		-3.0	
12	-.1		-.2		-2.9	
13	-.2		-.5		-3.0	
14	-.2		-.4		-3.0	
15	-0.1		-0.2		-2.8	
16	-.2		-.4		-3.0	

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer [signature] Date 8/25/81

Test Supervisor [signature] III Date AUG. 27, 1981

Quality Control Stamp D. Weinhaupt Date Aug. 27, 1981

18

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 15

ORIGINAL PAGE IS
OF POOR QUALITY

4.6

Channel	Boost Resistor Values	908600-( )	Rolloff Resistor Value	908600-( )
1	R1 2.67 K	-167	R65 15.4 K	-240
2	R9 2.87 K	-170	R73 88.7 K	-313
3	R2 4.32 K	-187	R66 54.9 K	-293
4	R10 3.32 K	-176	R74 54.9 K	-293
5	R3 4.12 K	-185	R67 66.5 K	-301
6	R11 3.83 K	-182	R75 66.5 K	-301
7	R4 3.16 K	-174	R68 80.6 K	-309
8	R12 3.57 K	-179	R76 80.6 K	-309
9	R5 4.12 K	-185	R69 54.9 K	-293
10	R13 2.87 K	-170	R77 37.4 K	-277
11	R6 3.74 K	-181	R70 49.9 K	-289
12	R14 3.92 K	-183	R78 73.2 K	-305
13	R7 4.53 K	-189	R71 30.9 K	-269
14	R15 3.57 K	-179	R79 49.9 K	-289
15	R8 3.83 K	-182	R72 26.7 K	-263
16	R16 3.09 K	-173	R80 39.2 K	-279

Test Engineer [signature] Date Aug 28 1981

Test Supervisor [signature] III Date AUG. 29, 1981

Quality Control Stamp J. Weinhaupt 10 Date Aug. 29, 1981

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 10

FORM NC 0.22 DIETERICH-POST CLEARPRINT 1000H

4.6

ORIGINAL PAGE IS
OF POOR QUALITY

Channel	Frequency Trim Capacitor Designator	Value	908505 -
1	C33	OPEN	N/A
3	C34		
5	C35		
7	C36		
9	C37		
11	C38		
13	C39		
15	C40		
2	C41		
4	C42		
6	C43		
8	C44		
10	C45		
12	C46		
14	C47		
16	C48	OPEN	N/A

Planning Operation No. 1300 OF 50964-A3 2600 OF 50797

Tested by N/A Date

Test Supervisor [signature] Date AUG. 27, 1981

Quality Inspection Stamp [signature] Date Aug 27, 1981

TITLE

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 17

LIMIT:
2.4 pA

Ch	METER	POST-AMP OUT (dB)	PRE-AMP OUT (dB)	SCOPE GAIN (dB) (on 10mV scale)	PRE-AMP OUT (mV)	FEEDBACK RESISTOR	WIDEBAND NOISE(pA)
1	~~.88~~ .93	+3.27	-16.67	33.4 dB	2.00	.93	2.2
2	.79	+3.20	~~-15.62~~ *	33.4	2.18	1.05	2.1
3	.99	+3.25	-16.89	33.4	2.08	.92	2.3
** 4	1.07	+3.20	-16.17	33.4	2.46	.96	2.6
5	.86	+3.05	-17.57	33.4	1.71	.84	2.0
6	.86	+3.17	-16.20	33.4	1.98	.95	2.1
7	.81	+3.19	-16.89	33.4	1.72	.88	2.0
8	.84	+3.28	-16.11	33.4	1.93	.98	2.0
** 9	1.23	+3.23	-16.74	33.4	2.64	.90	2.9
10	.81	+3.21	-15.94	33.4	1.91	.98	2.0
11	.86	+3.23	-16.76	33.4	1.84	.90	2.0
12	.91	+3.18	-17.02	33.4	1.90	.88	2.2
13	1.02	+3.24	-16.85	33.4	2.16	.90	2.4
14	.85	+3.19	-16.04	33.4	1.99	.98	2.0
15	.94	+3.17	-17.29	33.4	1.91	.85	2.?
16	.90	+3.13	-16.25	33.4 dB	2.14	.96	2.2

* -15.62 NCD

Test Engineer [signature] Date Aug 26, 1981

Test Supervisor [signature] Date AUG. 27, 1981

**SEE FR8317 & HS 236-7663

Quality Control Stamp ** [stamp] VOID DATA OUT OF SPEC CM 4,9 FR 8317 Date 8-27-81

ORIGINAL PAGE IS OF POOR QUALITY

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 19

ORIGINAL PAGE IS
OF POOR QUALITY

-8- Crosstalk

Limit: −40 dB (Nearest Neighbors); −60 dB (Average of Non-Neighbors)

Source Channel	Nearest Neighbors								Average of Non-Neighbors
1					2	-54	3	-41	-60
2			1	-60	3	-56	4	-44	-60
3	1	-45	2	-56	4	-54	5	-42	-60
4	2	-44	3	-57	5	-57	6	-44	-60
5	3	-45	4	-57	6	-60	7	-43	-61
6	4	-43	5	-52	7	-58	8	-47	-60
7	5	-47	6	-56	8	-59	9	-46	-60
8	6	-47	7	-43	9	-54	10	-43	-60
9	7	-47	8	-58	10	-60	11	-45	-60
10	8	-47	9	-54	11	-58	12	-45	-60
11	9	-45	10	-56	12	-56	13	-45	-60
12	10	-45	11	-59	13	-59	14	-47	-60
13	11	-46	12	-60	14	-58	15	-41	-60
14	12	-44	13	-50	15	-57	16	-45	-60
15	13	-45	14	-59	16	-66			-60
16	14	-44	15	-43					-61

Test Engineer ______ Date Aug 27 1981

Test Supervisor ______ Date AUG. 27, 1981

Quality Control Stamp ______ Date Aug 27 1981

4.9 Ground Continuity and Isolation

REQUIREMENTS:

Signal GND Continuity	8 Ohms	Limit: (< 11 Ohms)	
Signal GND-PWR Gnd Isolation	✓	OK	(>1 M ohms)
Signal GND-Chassis Isolation	✓	OK	(>1 M ohms)
J1-16 ODD to J1-16 EVEN	✓	OK	(<25 ohms all bands)

4.10 Time Delay

ORIGINAL PAGE IS OF POOR QUALITY

Channel	Rise Time	Fall Time
1	11.8 μSec	11.6 μSec
2	11.6 μSec	11.6 μSec
3	12.2 μSec	12.0 μSec
4	11.8 μSec	11.6 μSec
5	11.6 μSec	11.4 μSec
6	11.8 μSec	11.6 μSec
7	12.0 μSec	12.0 μSec
8	11.6 μSec	11.6 μSec
9	11.6 μSec	11.4 μSec
10	11.8 μSec	11.6 μSec
11	11.8 μSec	11.6 μSec
12	11.8 μSec	11.6 μSec
13	12.4 μSec	12.2 μSec
14	12.0 μSec	11.8 μSec
15	12.4 μSec	12.0 μSec
16	12.0 μSec	11.6 μSec

Test Engineer Joe Kleeberg Date Aug 28 1981

Test Supervisor [signature] III Date AUG. 29, 1981

Quality Control E. Weishaupt Date Aug. 29, 1981

16

SIZE	CODE IDENT NO.	NUMBER
A	11323	16597
SCALE	REV H	SHEET 20

TEST DATA RECORD SUMMARY

THEMATIC MAPPER - FLIGHT

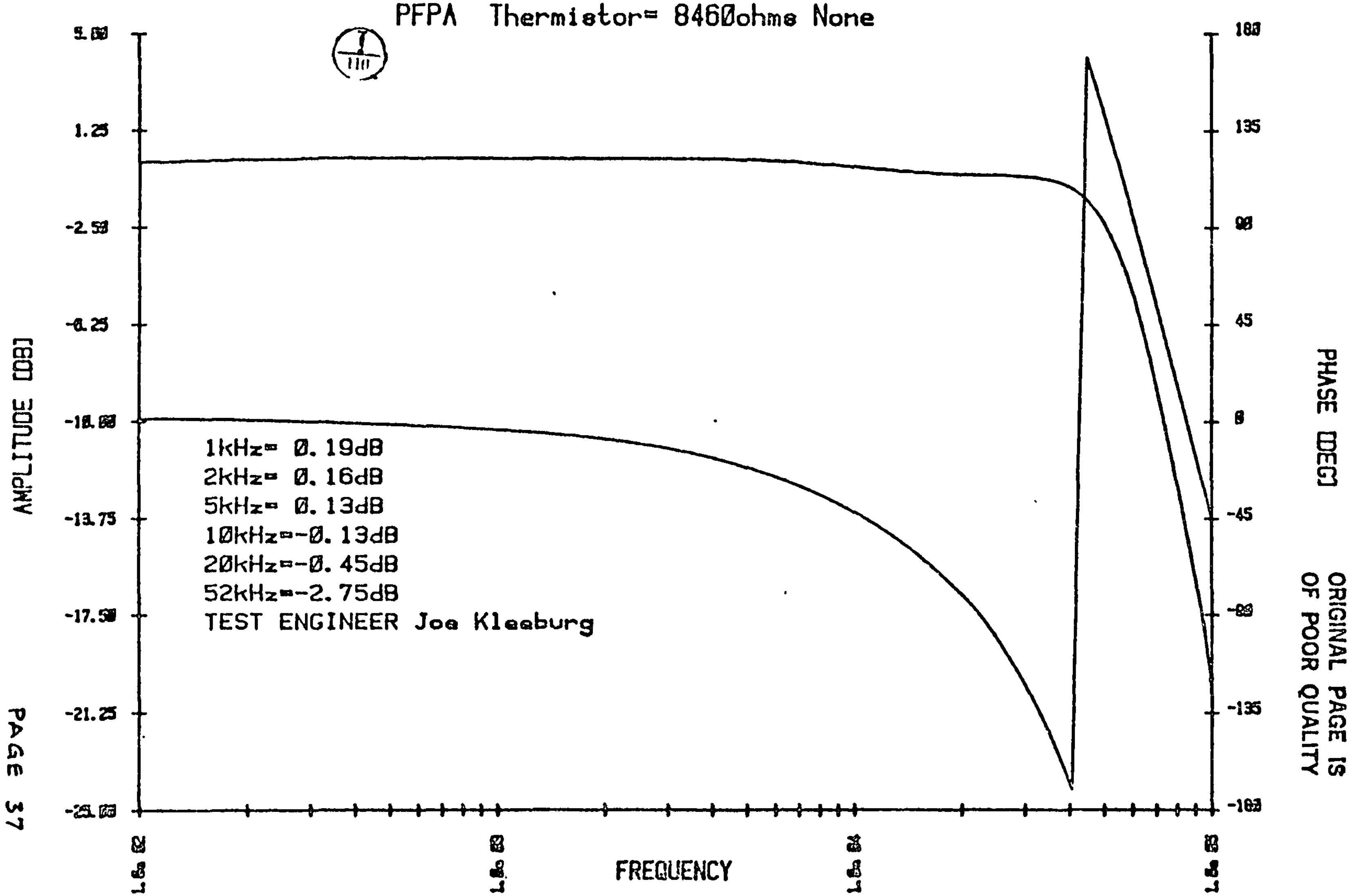
Band ~~4~~ 3 - Assembly 50797

S/N ~~201~~ 401

August 28, 1981

BAND ~~4~~3 CHANNEL 1 August 26, 1981

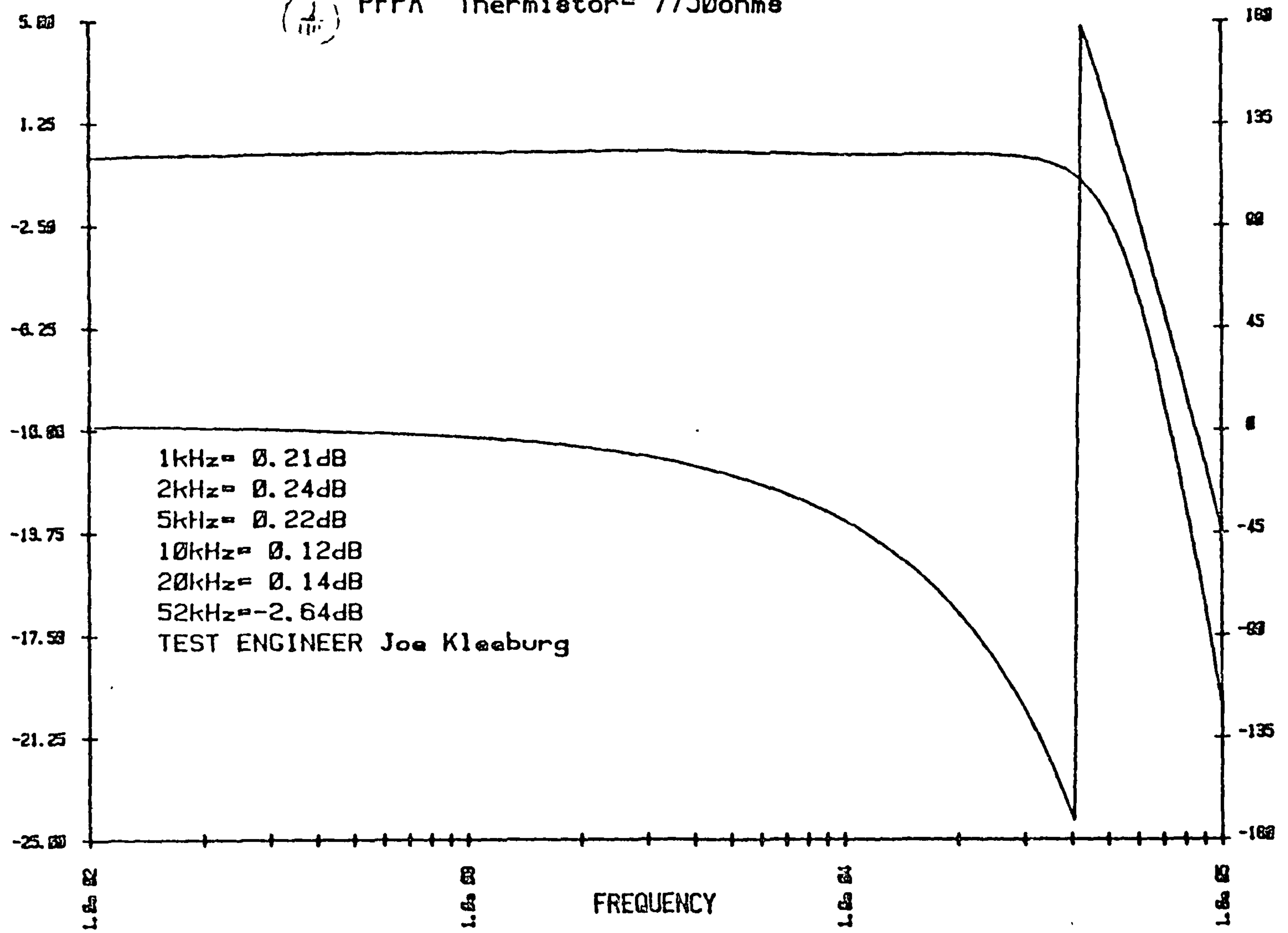
PFPA Thermistor= 8460ohms None



ORIGINAL PAGE IS
OF POOR QUALITY

BAND ~~4~~3 CHANNEL 2 8/26/81

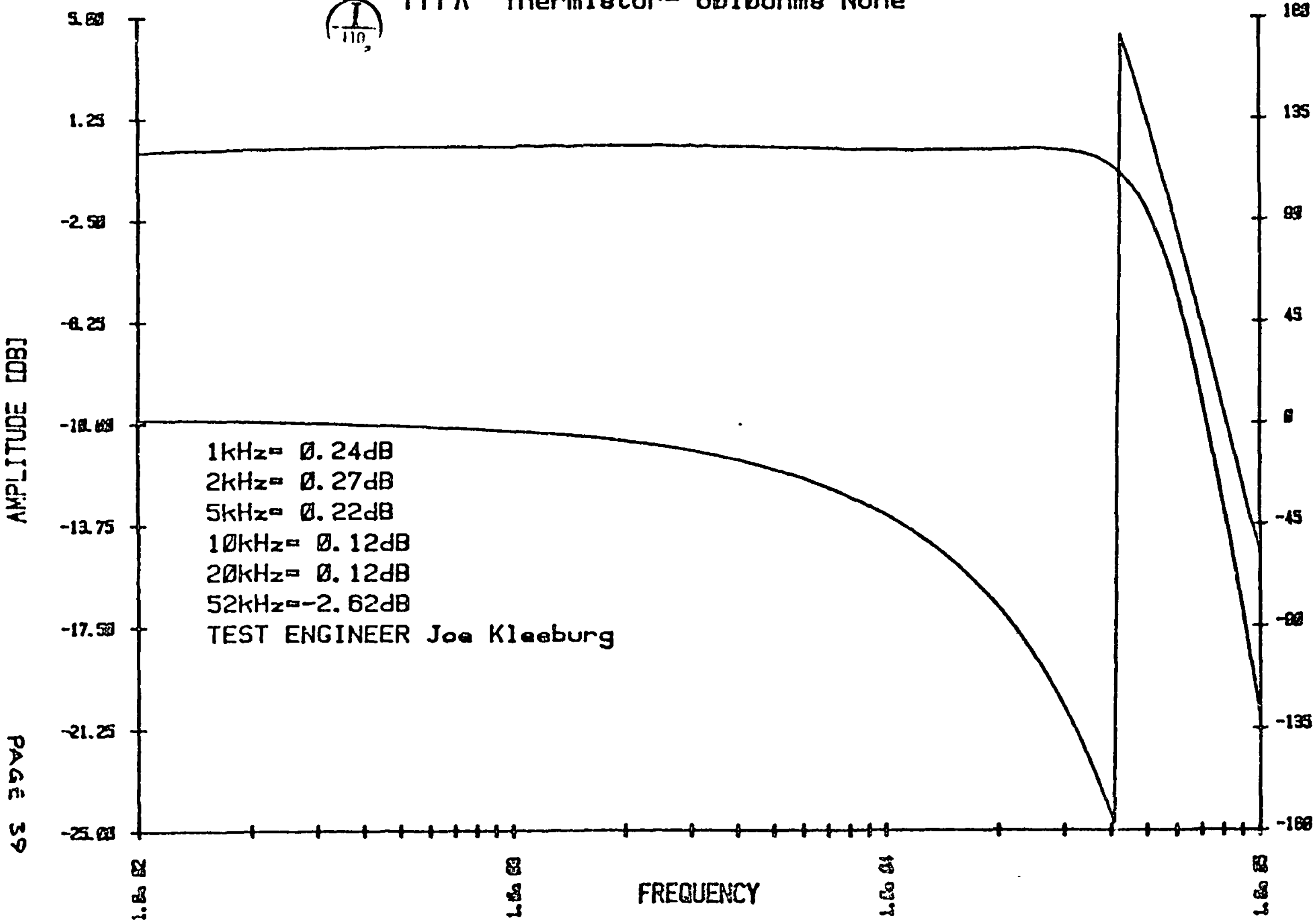
PFPA Thermistor= 7750ohms

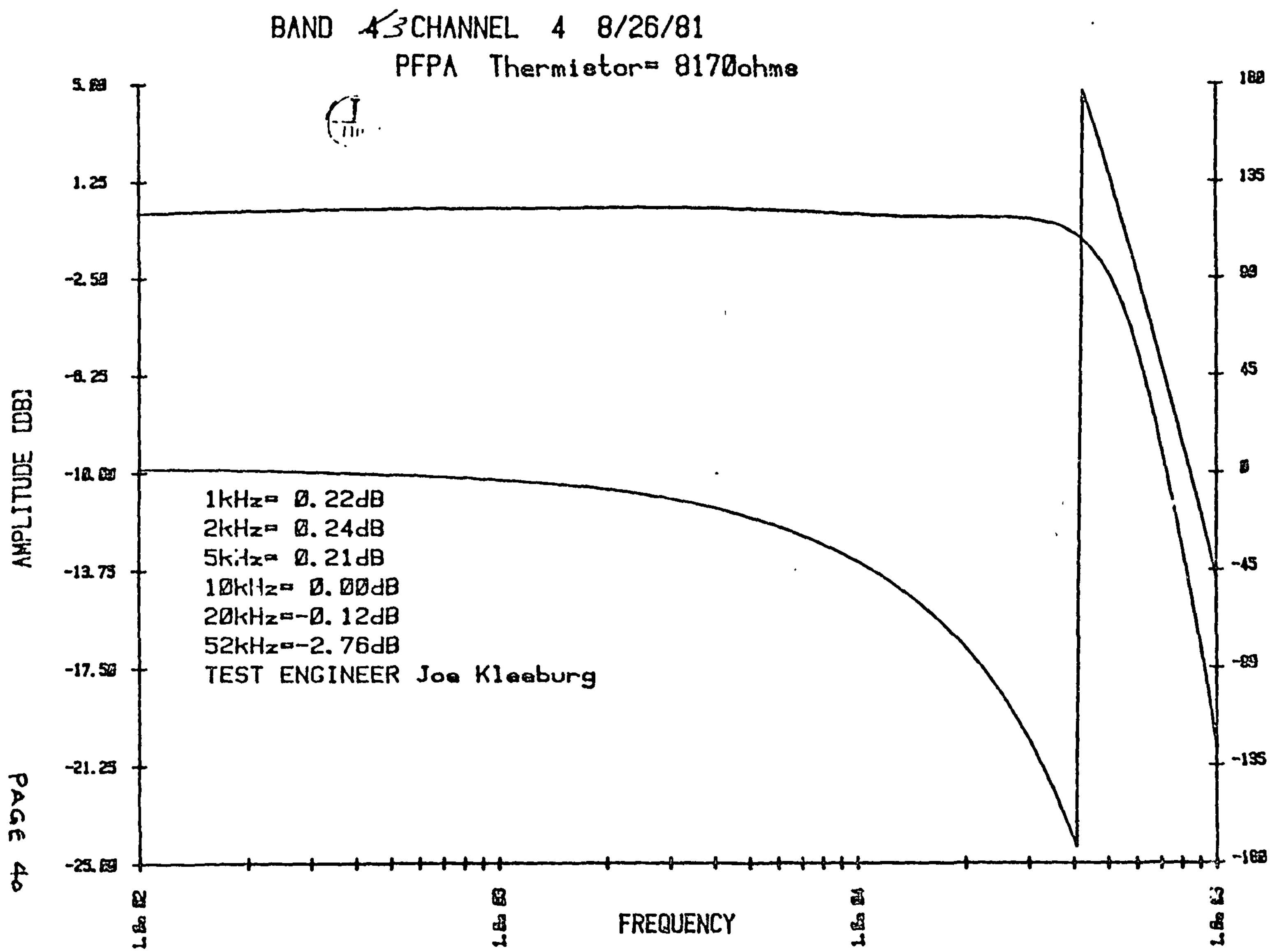


ORIGINAL PAGE IS OF POOR QUALITY

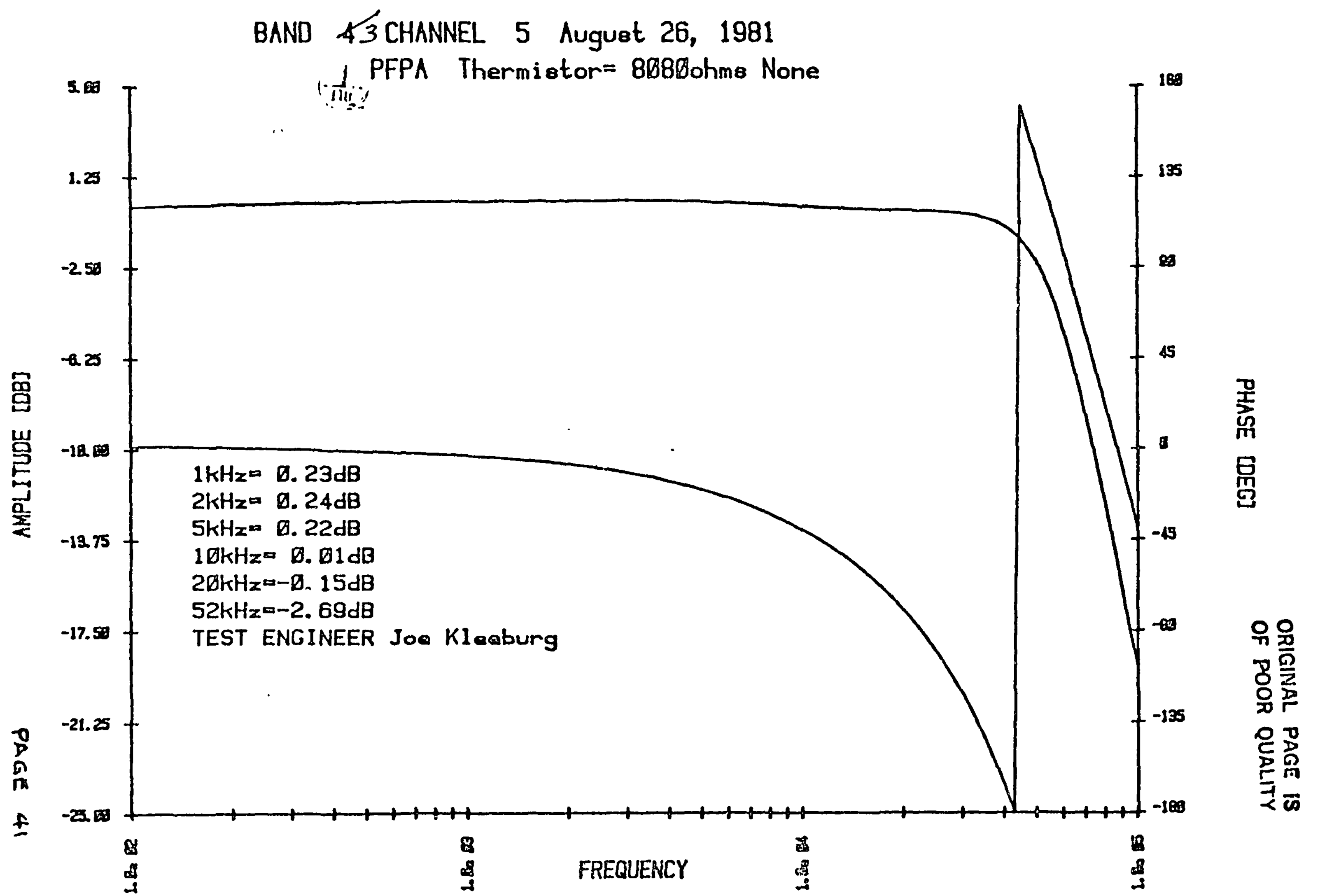
BAND ~~4~~ 3 CHANNEL 3 August 26, 1981

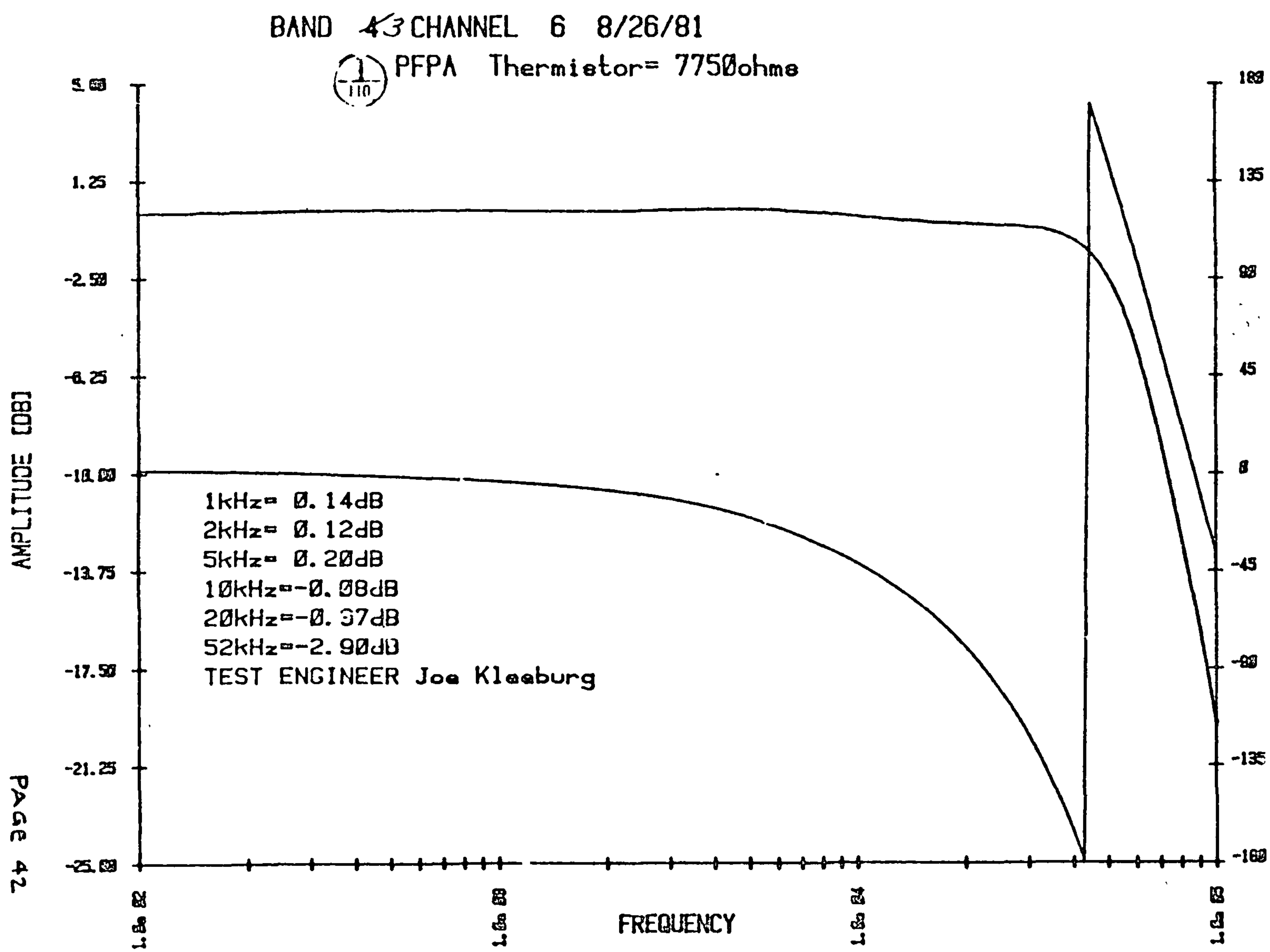
PFPA Thermistor= 8010ohms None





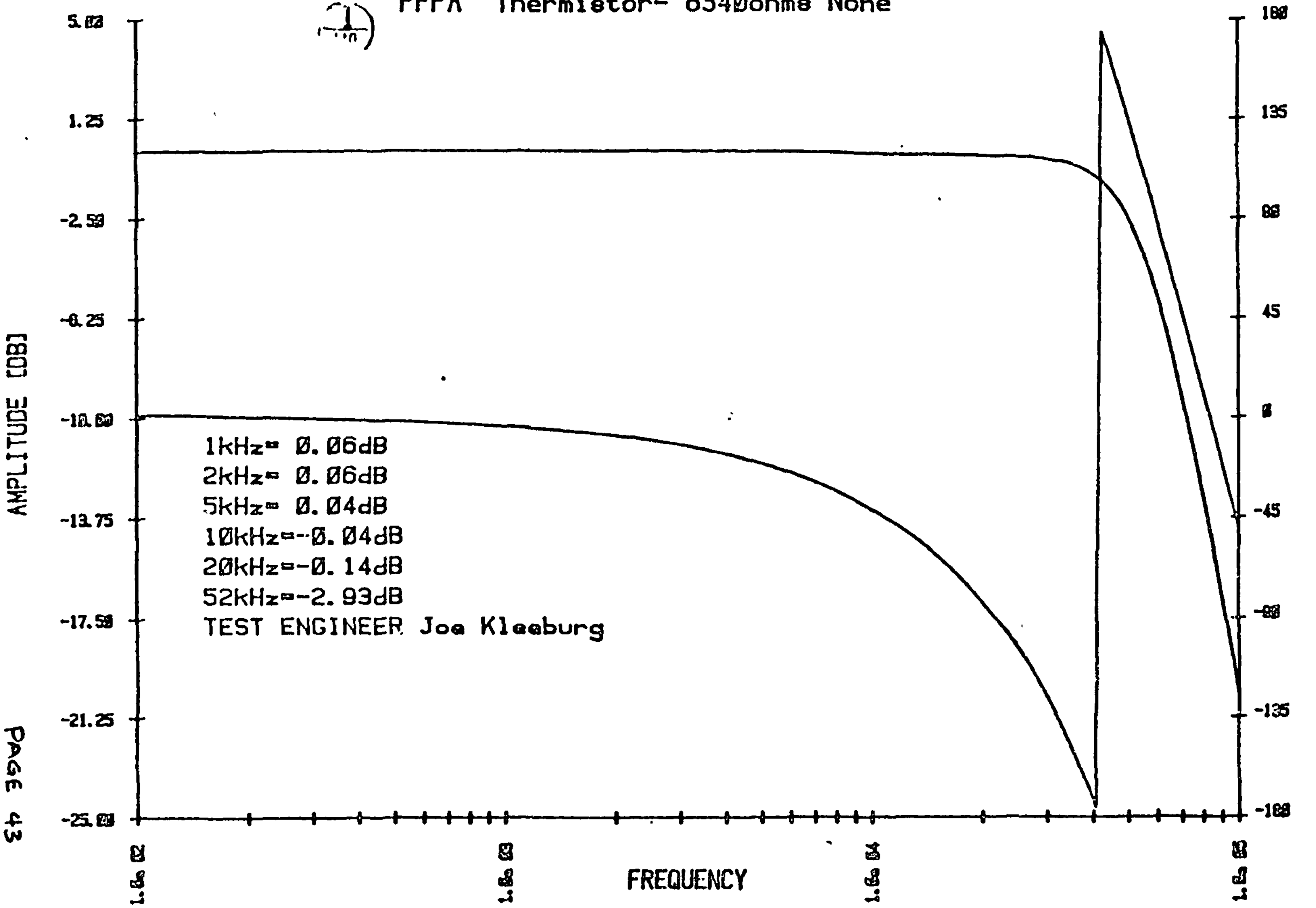
ORIGINAL PAGE IS OF POOR QUALITY


BAND 43 CHANNEL 5 August 26, 1981
PFPA Thermistor= 8080ohms None
1kHz= 0.23dB
2kHz= 0.24dB
5kHz= 0.22dB
10kHz= 0.01dB
20kHz=-0.15dB
52kHz=-2.69dB
TEST ENGINEER Joe Kleeburg
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
FREQUENCY

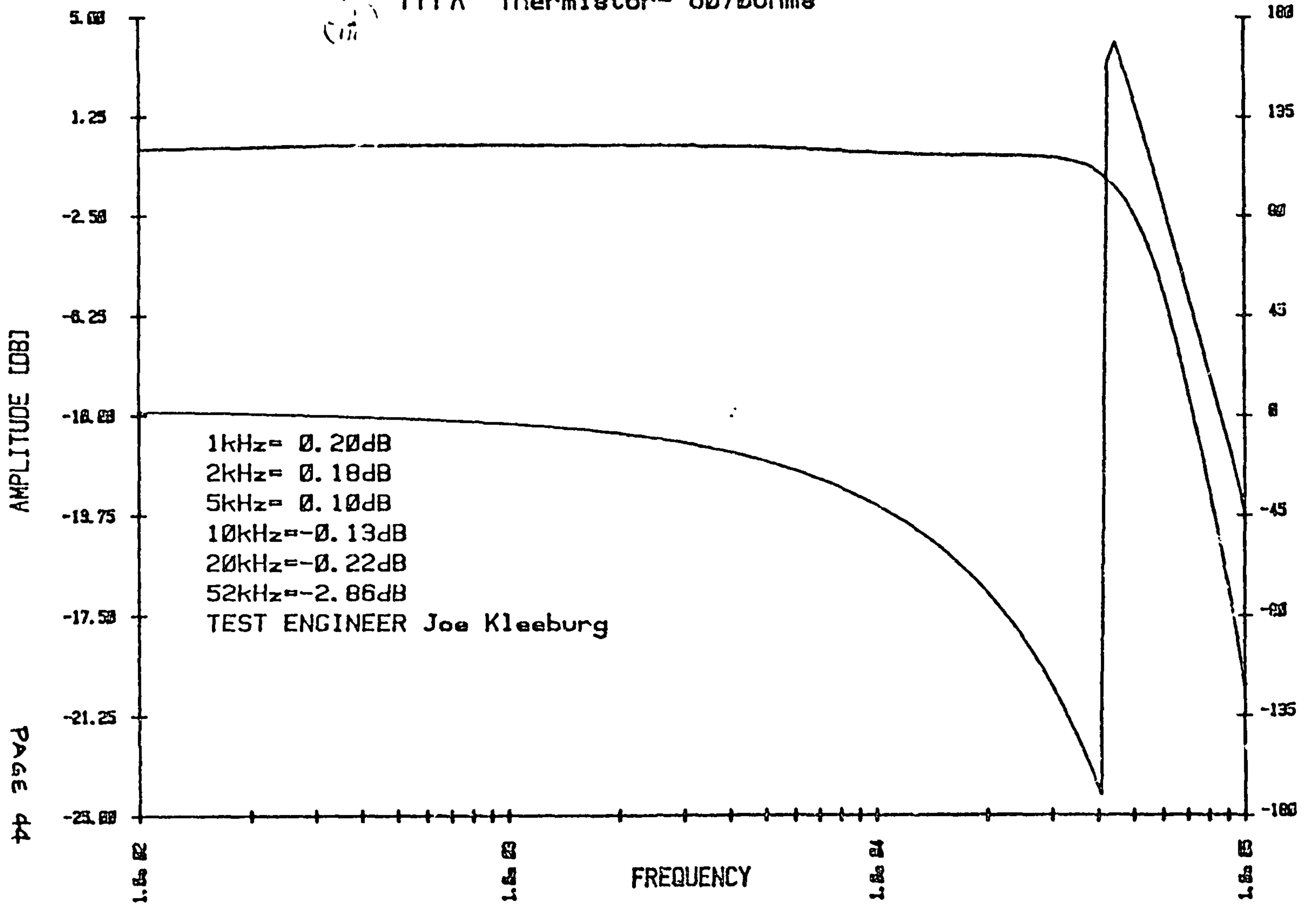

BAND 43 CHANNEL 6 8/26/81
PFPA Thermistor= 7750ohms
1kHz= 0.14dB
2kHz= 0.12dB
5kHz= 0.20dB
10kHz=-0.08dB
20kHz=-0.37dB
52kHz=-2.90dB
TEST ENGINEER Joe Kleeburg
AMPLITUDE [DB]
PHASE [DEG]
FREQUENCY
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
180
135
90
45
0
-45
-90
-135
-180

BAND 3,4 CHANNEL 7 August 26, 1981

PFPA Thermistor= 834Øohms None

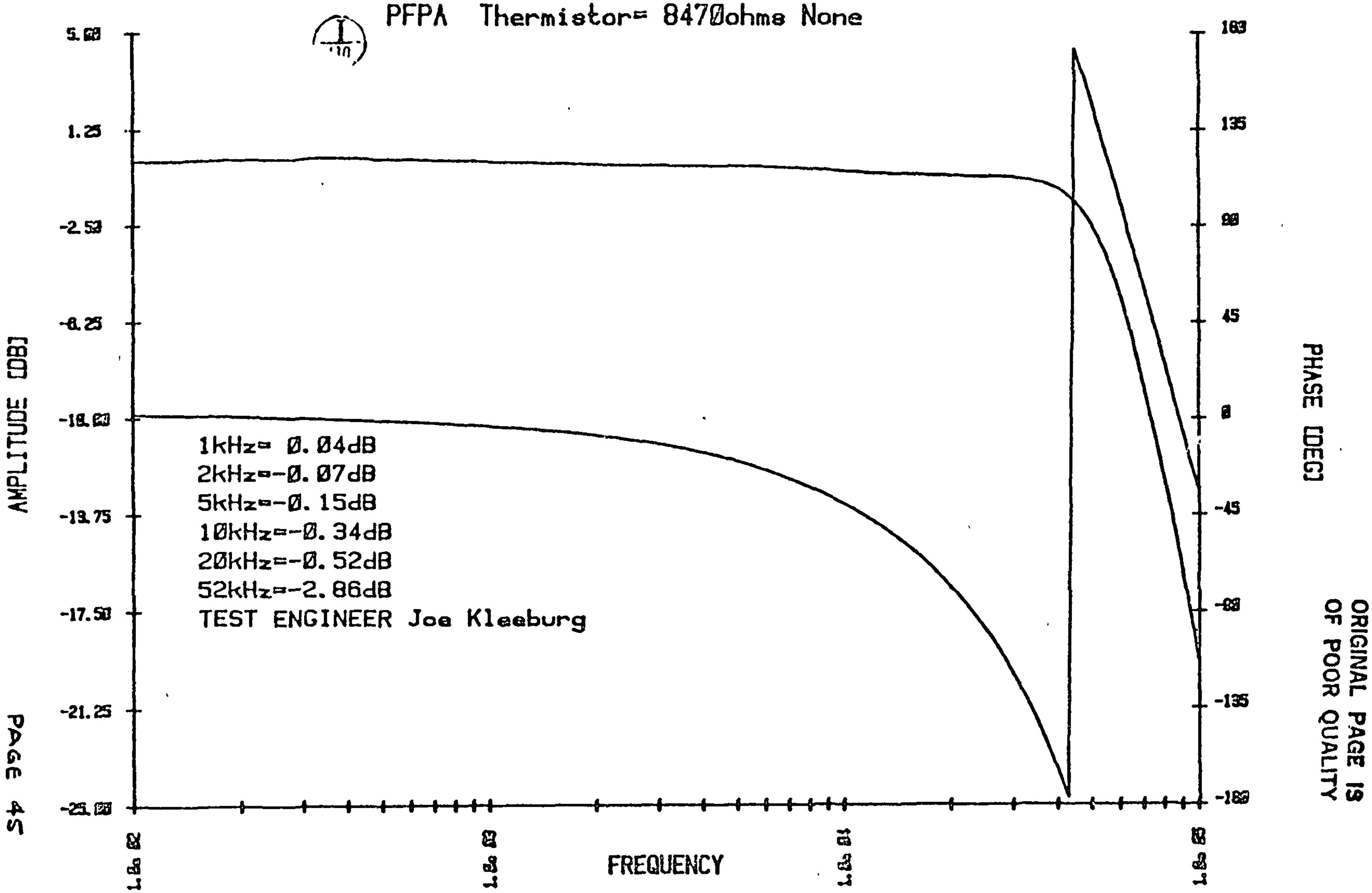


BAND ~~A~~ 3 CHANNEL 8 8/26/81
PFPA Thermistor= 8070ohms



BAND ~~4~~ 3 CHANNEL 9 August 26, 1981

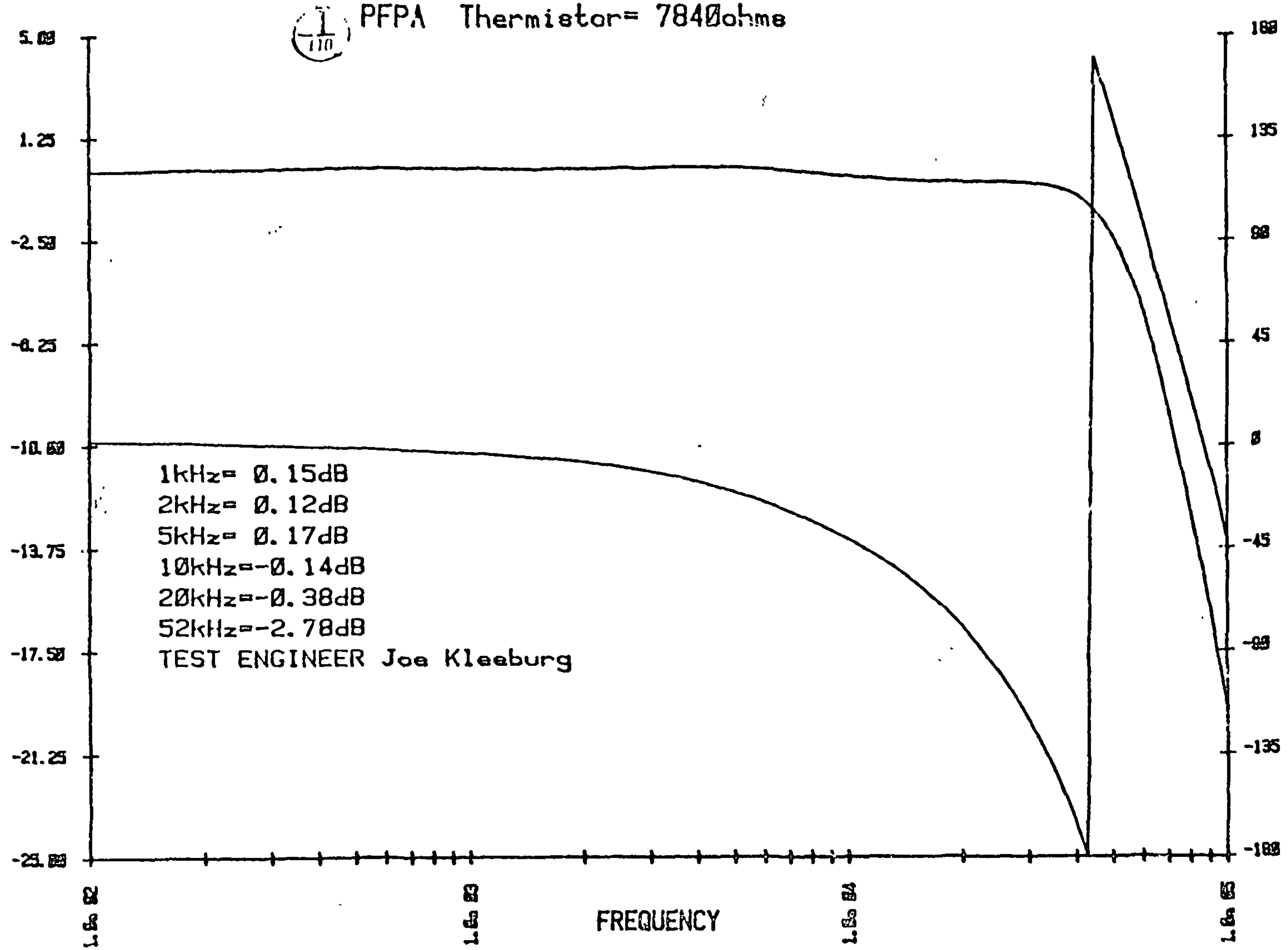
PFPA Thermistor= 8470ohms None



ORIGINAL PAGE IS
OF POOR QUALITY

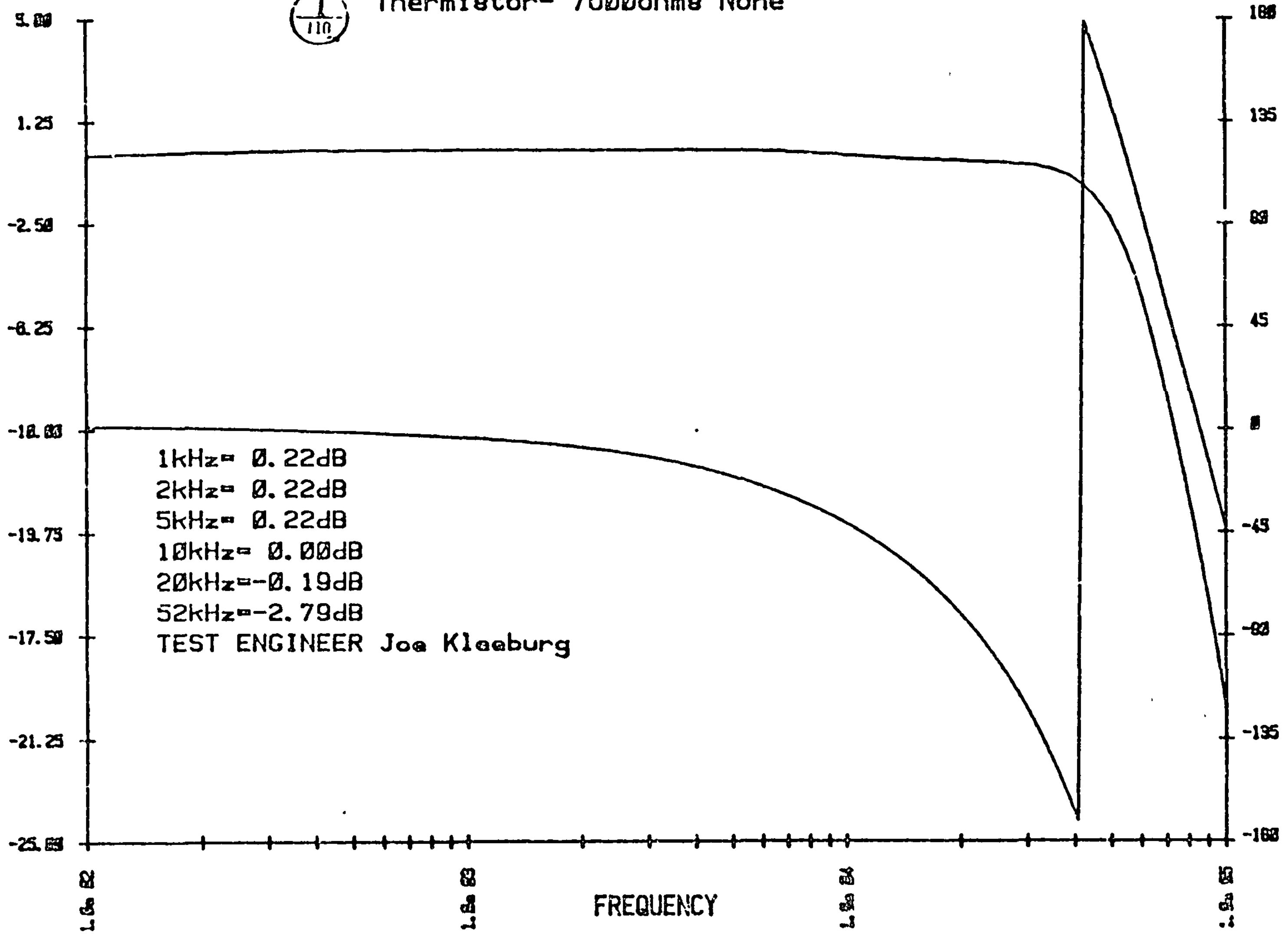
BAND ~~A~~3 CHANNEL 10 8/26/81

1/110 PFPA Thermistor= 7840ohms



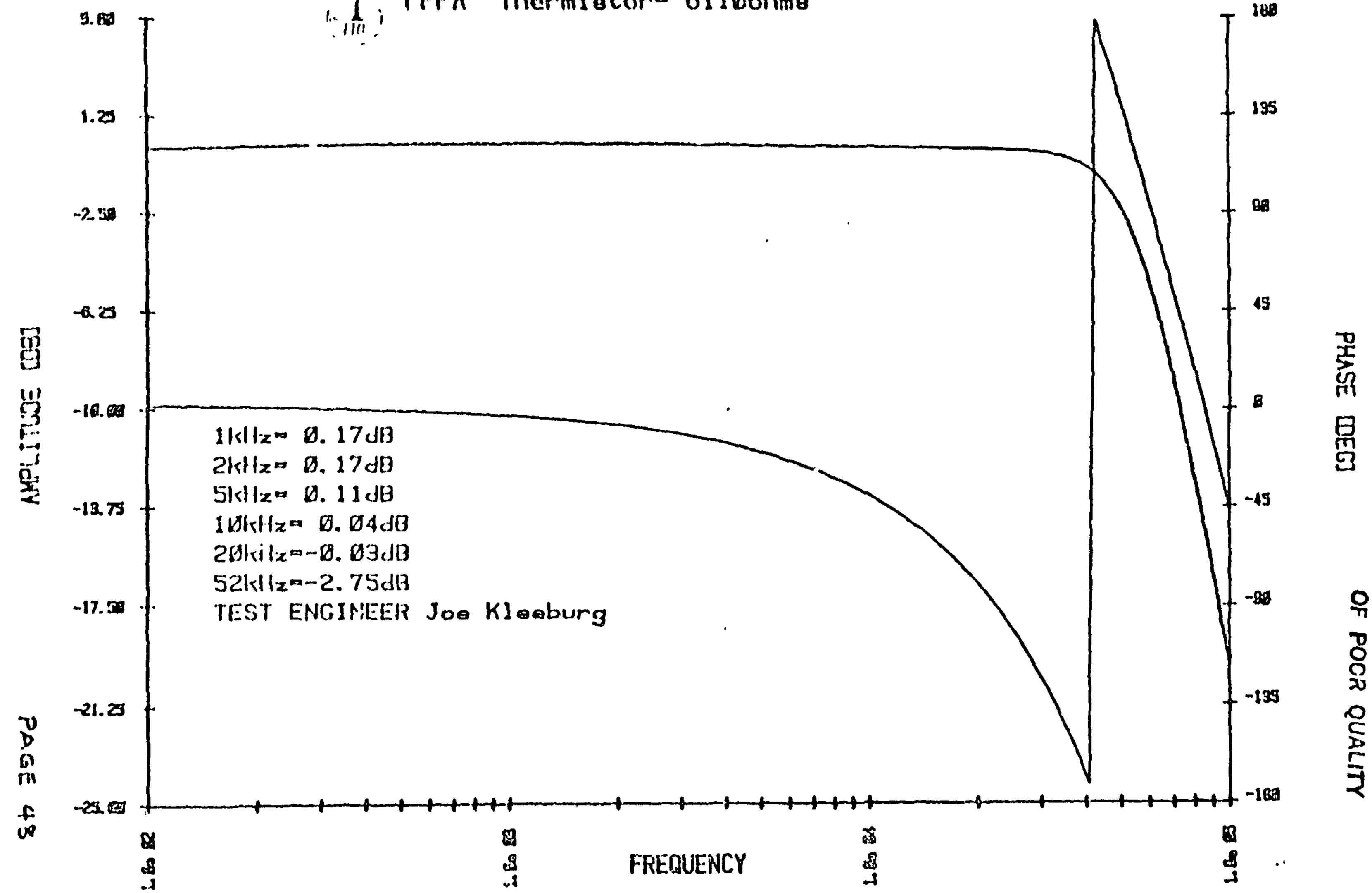
BAND A3 CHANNEL 11 August 26, 1981

Thermistor= 7600ohms None



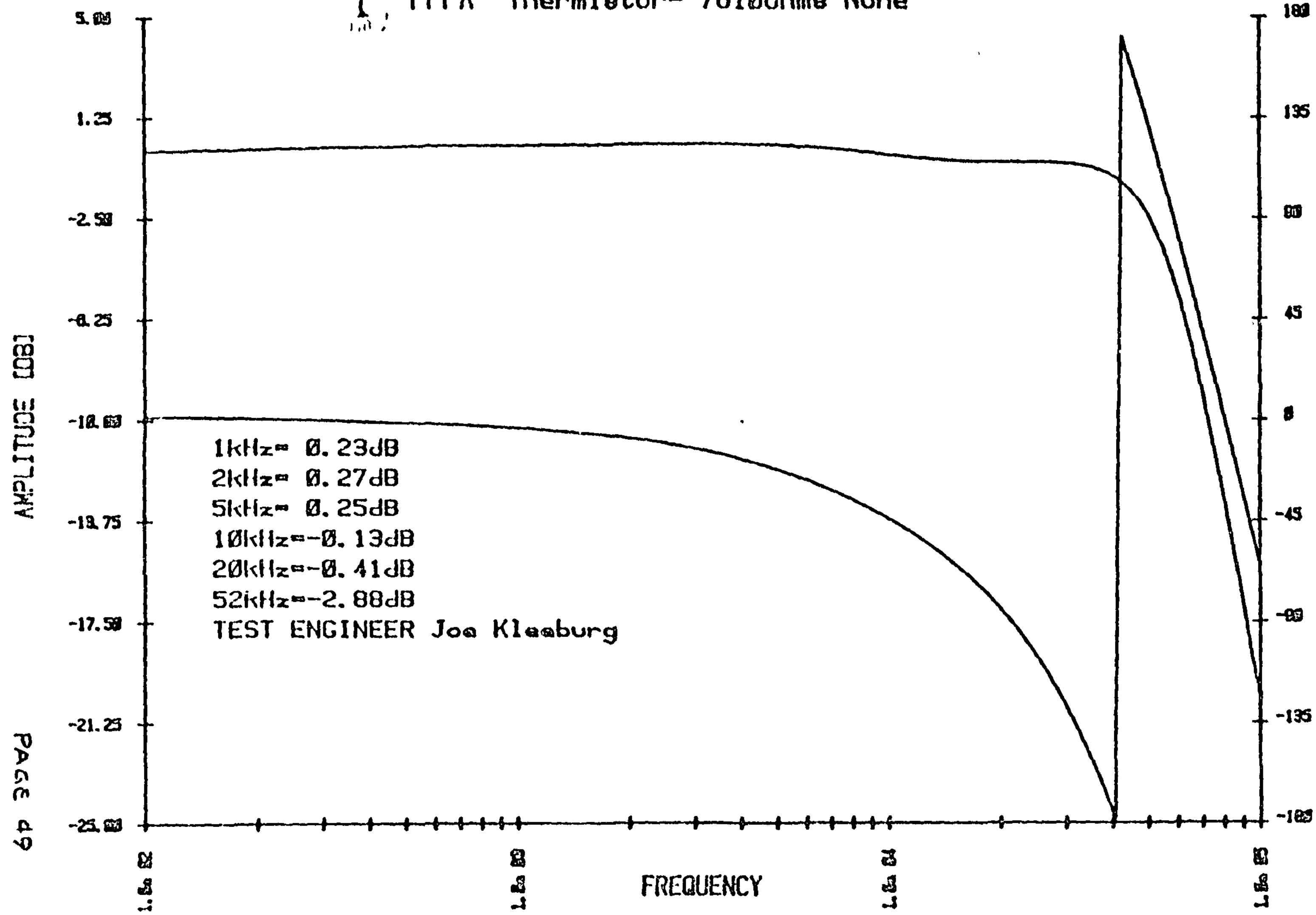
BAND A/3 CHANNEL 12 8/26/81

PFPA Thermistor= 8110ohms



BAND A3 CHANNEL 13 August 26, 1981

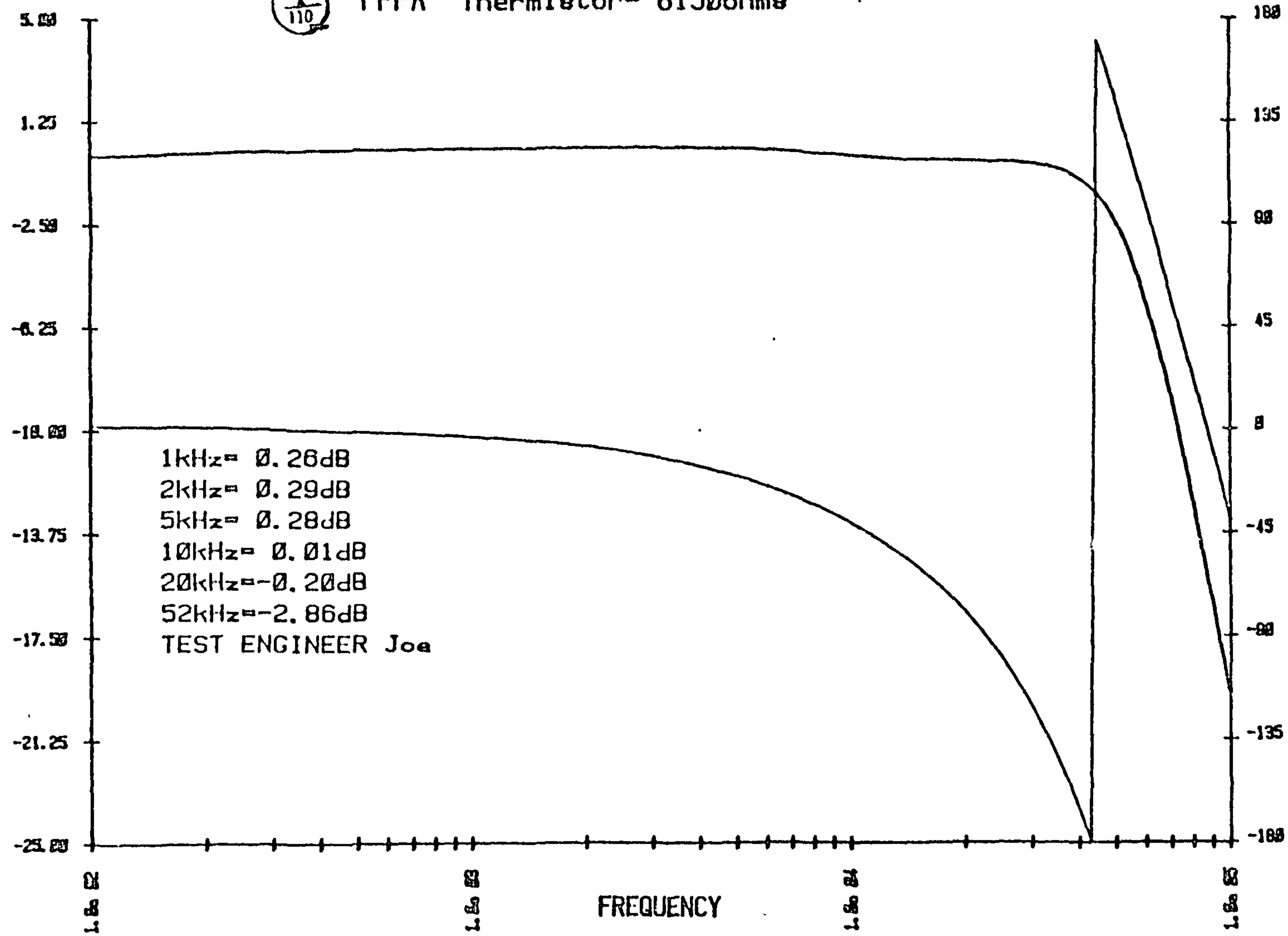
PFPA Thermistor= 7810ohms None



ORIGINAL PAGE IS OF POOR QUALITY

BAND ~~A~~ 3 CHANNEL 14 8/26/81

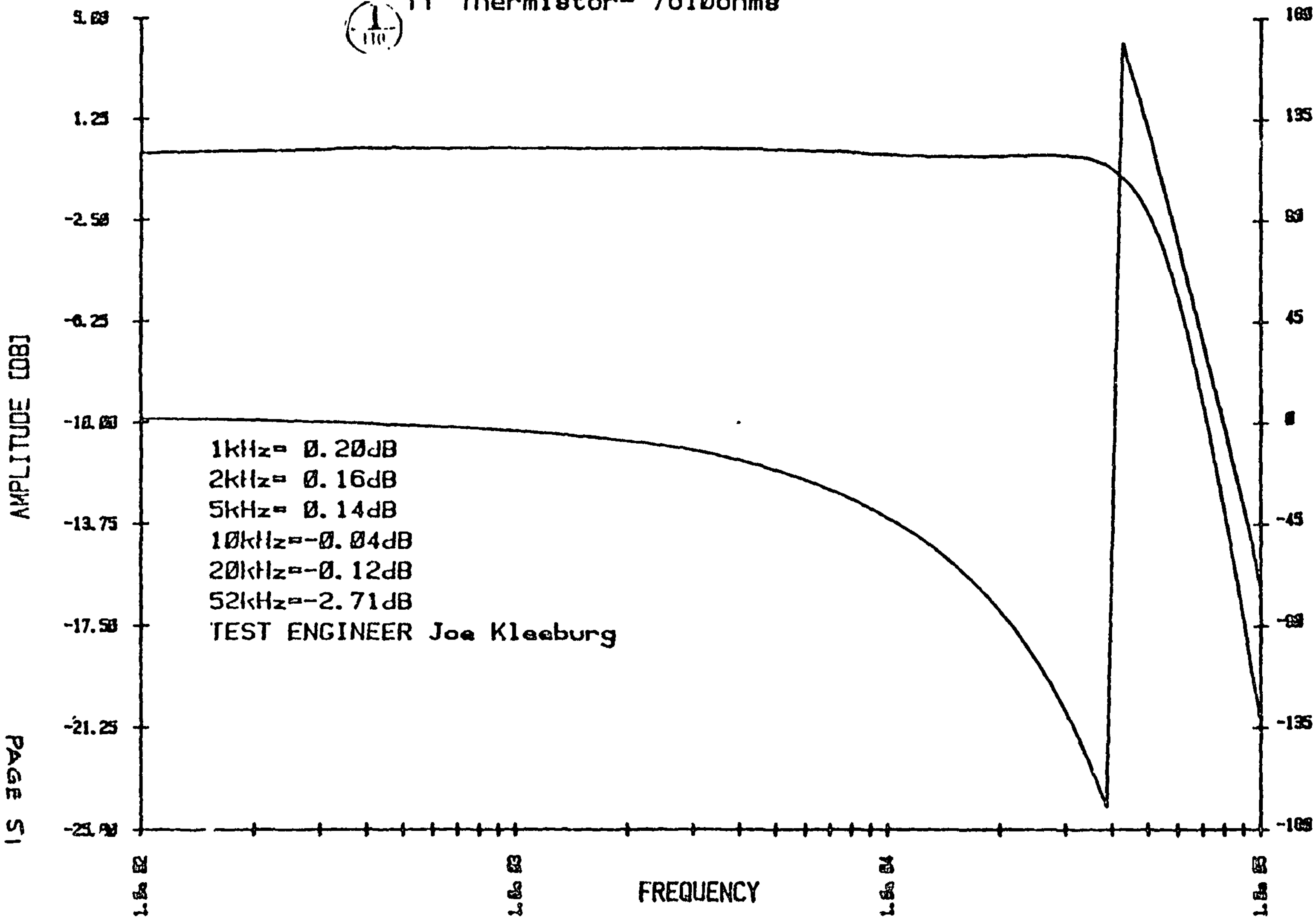
PFPA thermistor= 8150ohms



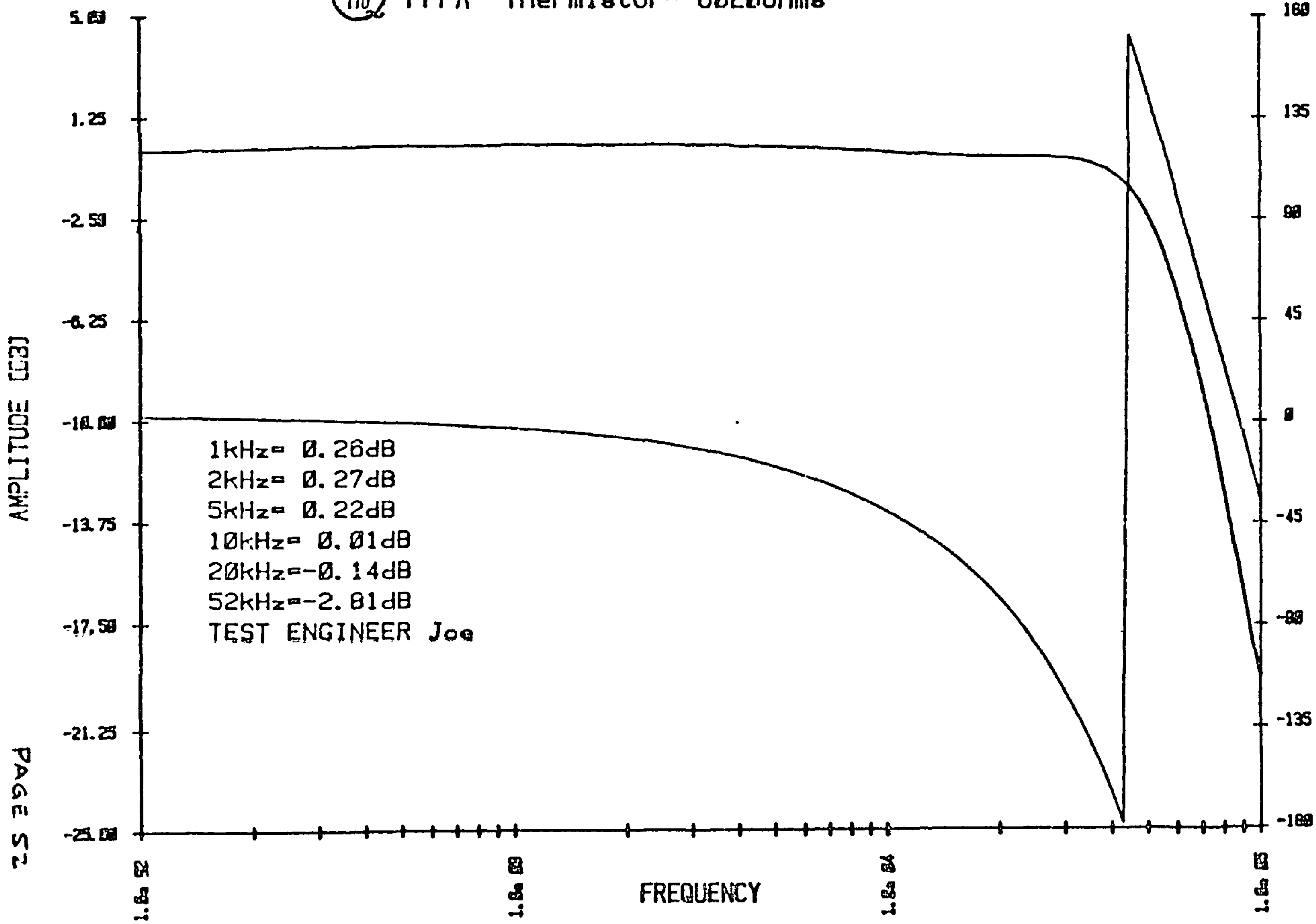
BAND 13 CHANNEL 15 8/26/81

PF Thermistor= 7810ohms

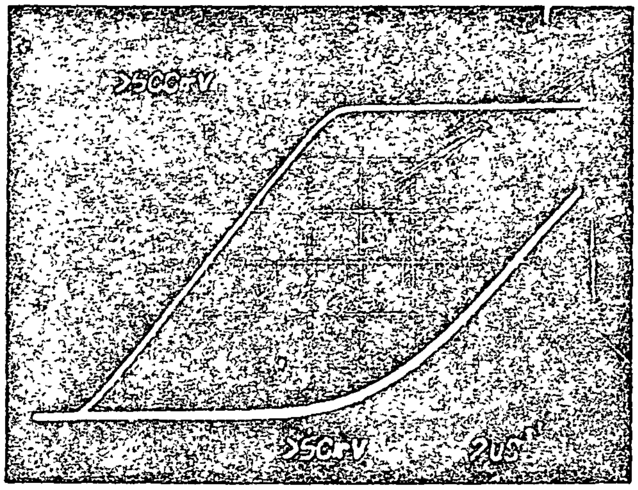
1/110



BAND ~~A~~ 3 CHANNEL 16 8/26/81
$\frac{1}{110}$ PFPA Thermistor= 8020ohms

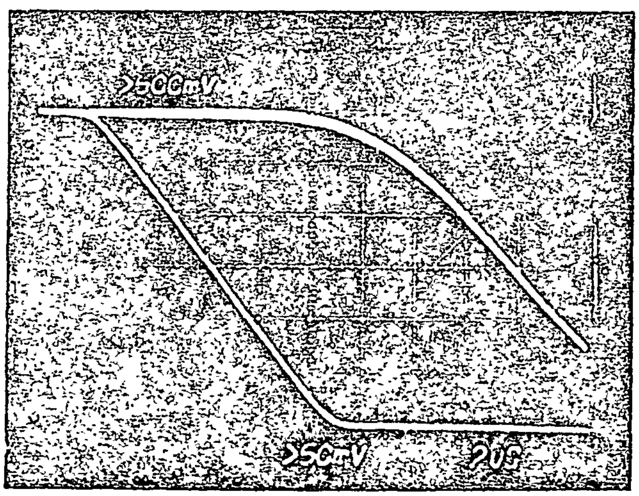


ORIGINAL PAGE IS
OF POOR QUALITY



BAND ~~4~~ 3 I/110
CHANNEL 1

DELAY TIME
11.8 μSec



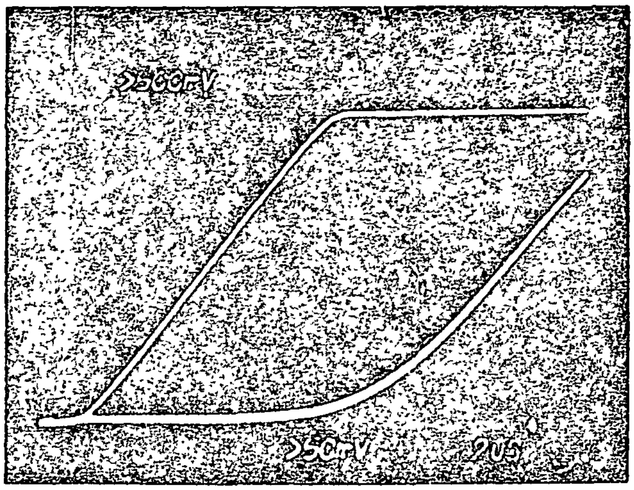
BAND ~~4~~ 3 I
CHANNEL 1

DELAY TIME
11.6 μSec

J.K.
N.C. DAVISON

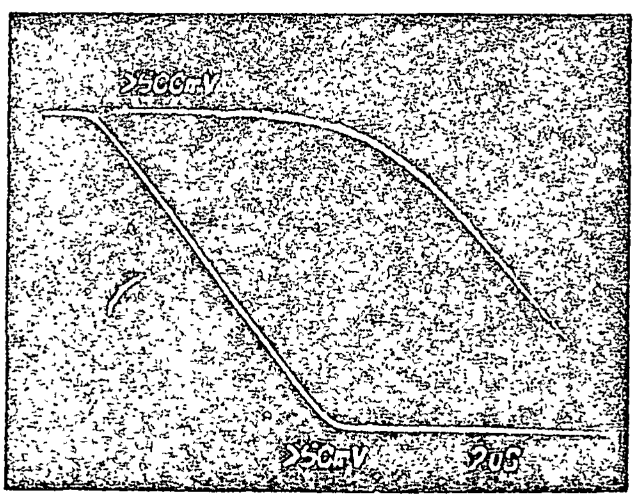
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND ~~4~~ 3 (I/110)
CHANNEL 2

DELAY TIME
11.6 μSec



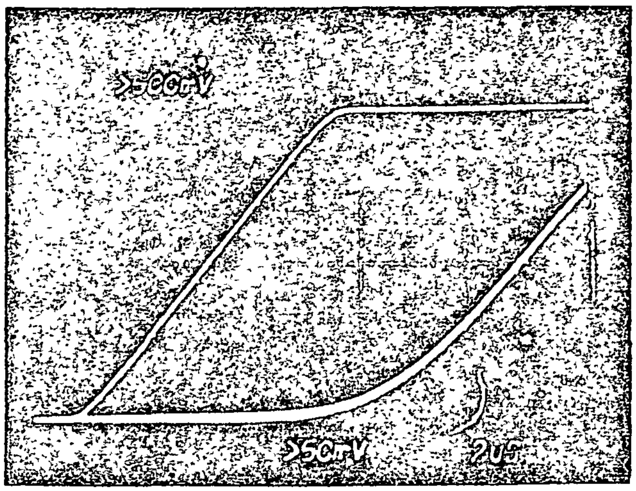
BAND ~~4~~ 3 (I/110)
CHANNEL 2

DELAY TIME
11.6 μSec

J.K.
N.C. DAVISON

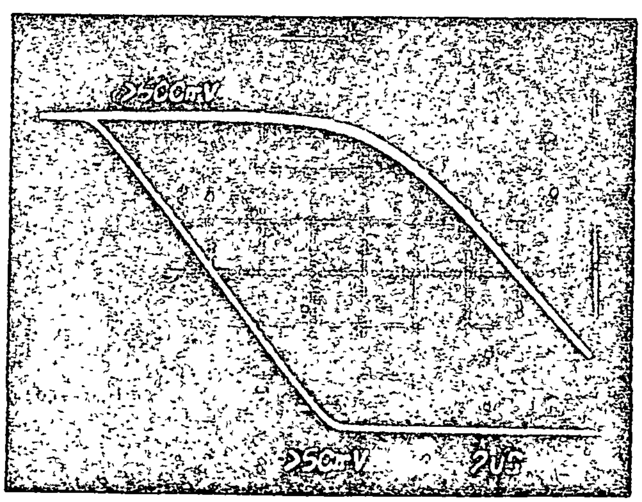
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 3

DELAY TIME
12.2 μSec



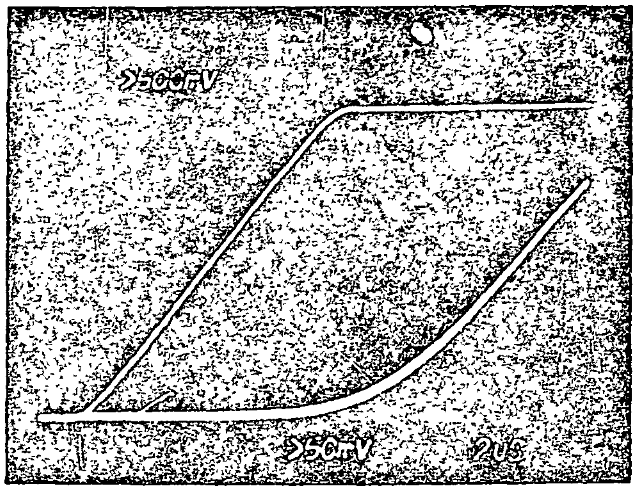
BAND #3
CHANNEL 3

DELAY TIME
12.0 μSec

J.K.
N.C. DAVISON

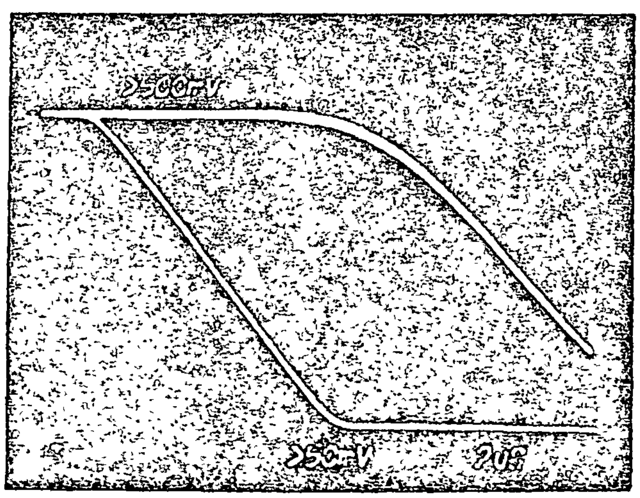
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3 (1/110)
CHANNEL 4

DELAY TIME
11.8 μSec



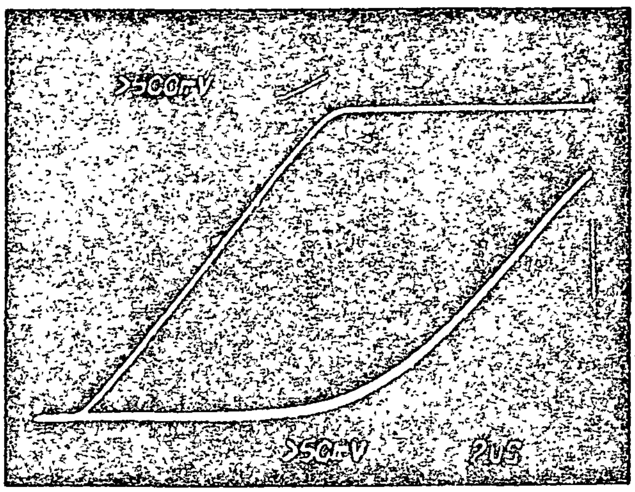
BAND #3 (1/110)
CHANNEL 4

DELAY TIME
11.6 μSec

J.K.
N.C. DAVISON

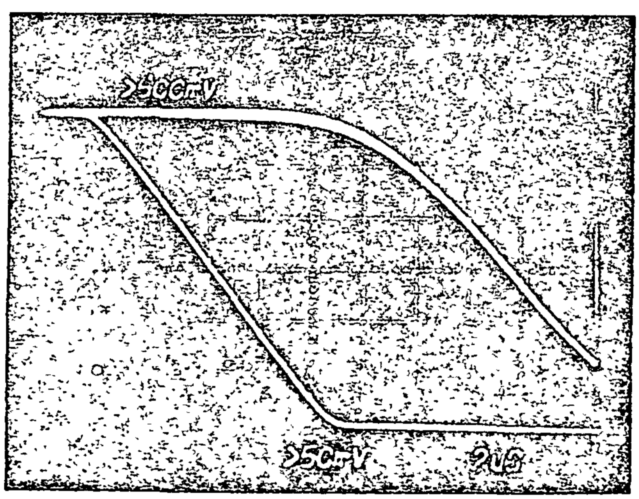
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 5

DELAY TIME
11.6 μSec



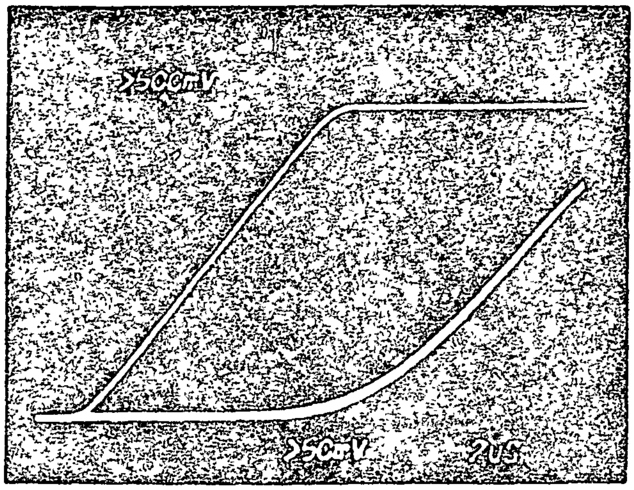
BAND #3
CHANNEL 5

DELAY TIME
11.4 μSec

J. K.
N. C. DAVISON

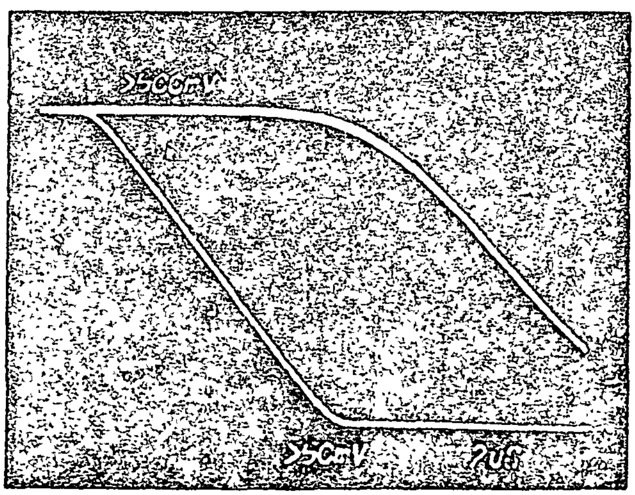
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 6

DELAY TIME
11.8 µSec



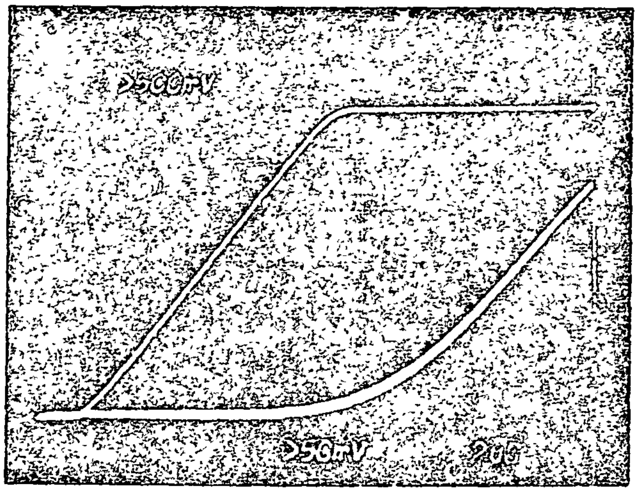
BAND #3
CHANNEL 6

DELAY TIME
11.6 µSec

J.K.
N.C. DAVISON

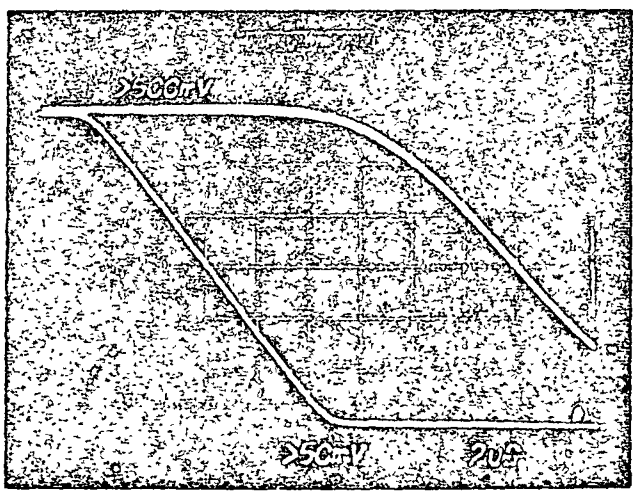
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 43
CHANNEL 7

DELAY TIME
12.0 μSec



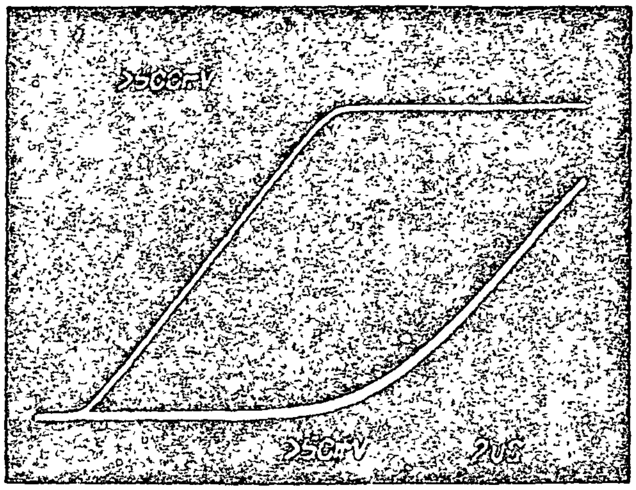
BAND 43
CHANNEL 7

DELAY TIME
12.0 μSec

J. K.
N.C. DAVISON

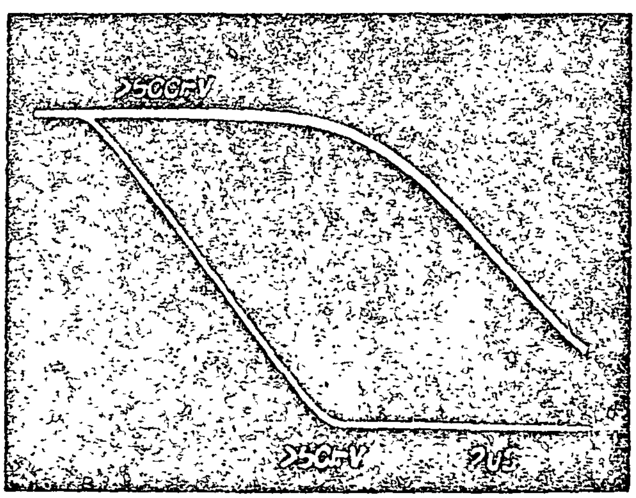
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 8

DELAY TIME
11.6 μSec



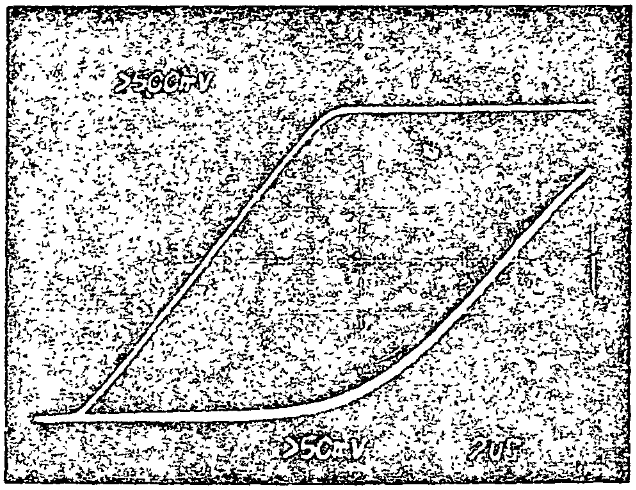
BAND #3
CHANNEL 8

DELAY TIME
11.6 μSec

J.K.
N.C. DAVISON

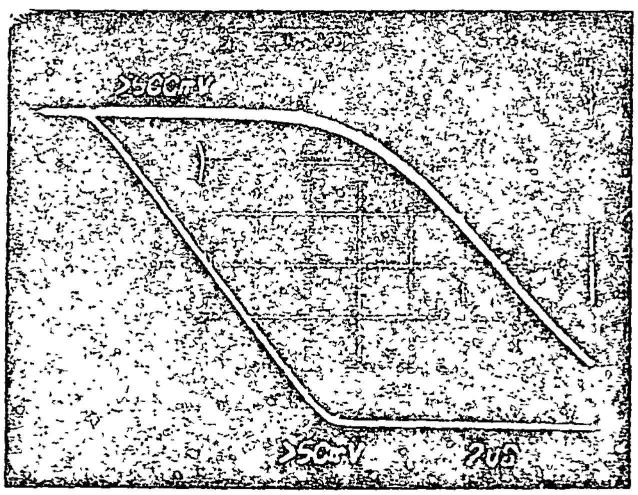
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3 $\frac{1}{110}$
CHANNEL 9

DELAY TIME
11.6 μSec



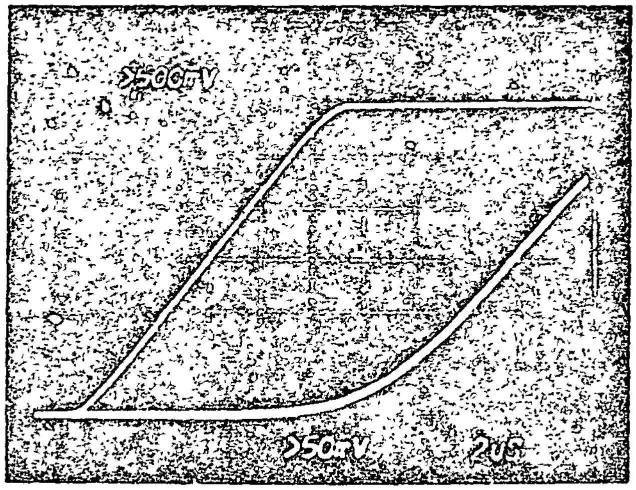
BAND #3 $\frac{1}{110}$
CHANNEL 9

DELAY TIME
11.4 μSec

J.K.
N.C. DAVISON

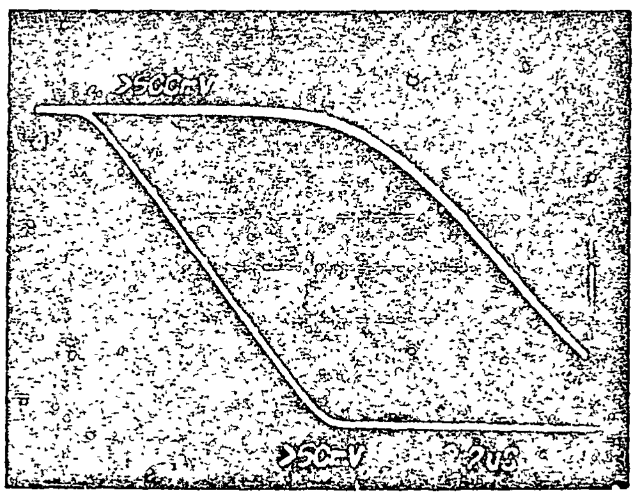
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 10

DELAY TIME
11.8 μSec



BAND #3
CHANNEL 10

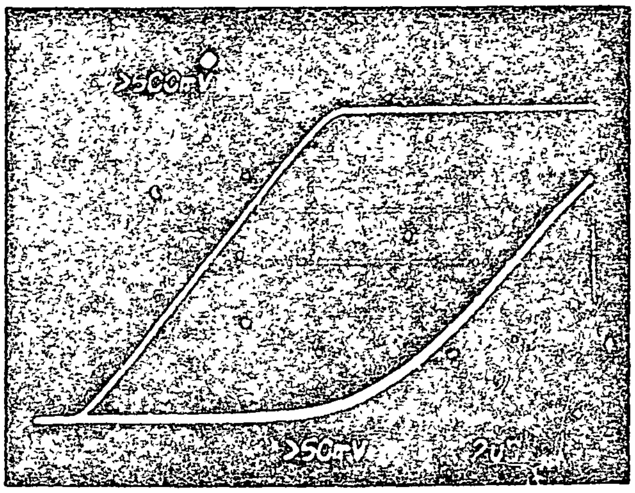
DELAY TIME
11.6 μSec

N.C. DAVISON

DATE: AUG. 28, 1981

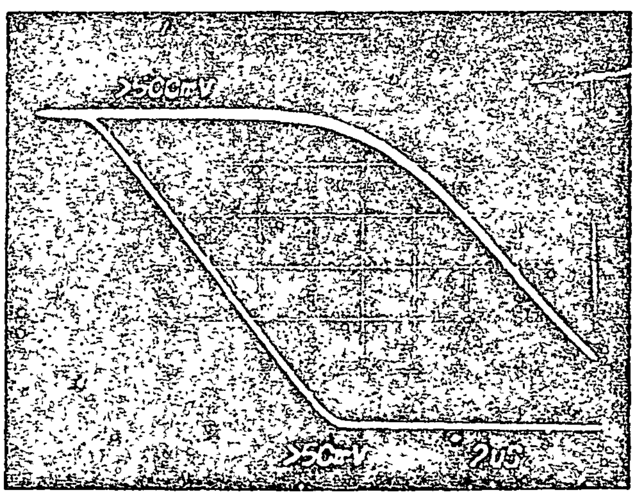
C-3

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 11

DELAY TIME
11.8 μSec



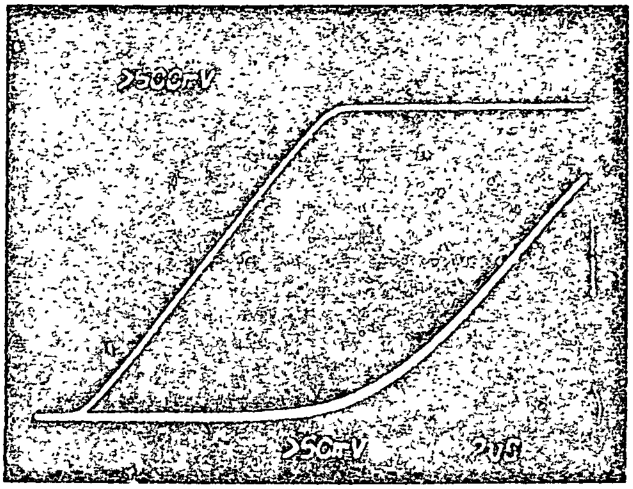
BAND #3
CHANNEL 11

DELAY TIME
11.6 μSec

J.K.
N.C. DAVISON

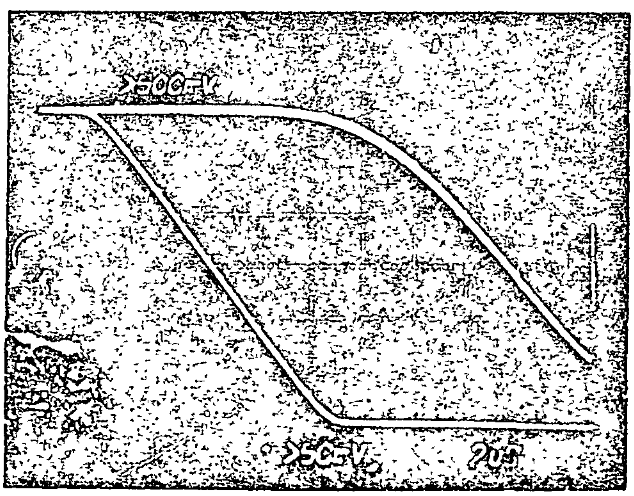
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 12

DELAY TIME
11.8 µSec



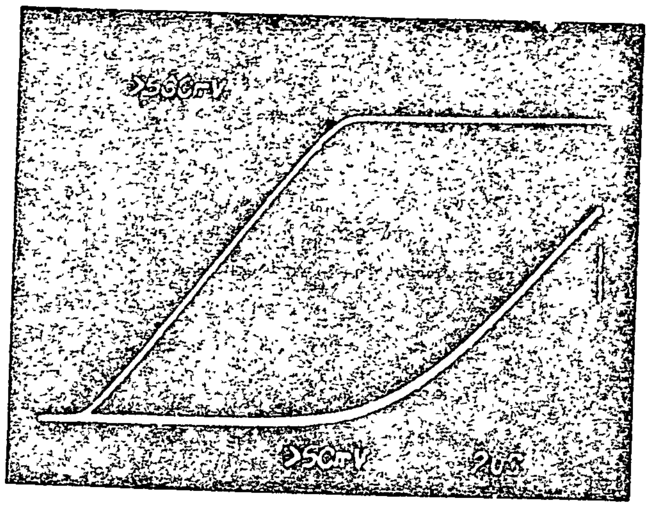
BAND #3
CHANNEL 12

DELAY TIME
11.6 µSec

J.K.
N.C. DAVISON

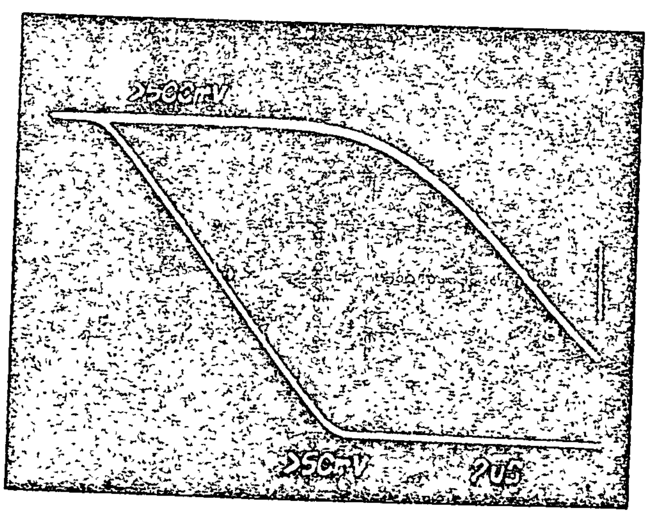
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 13

DELAY TIME
12.4 μSec



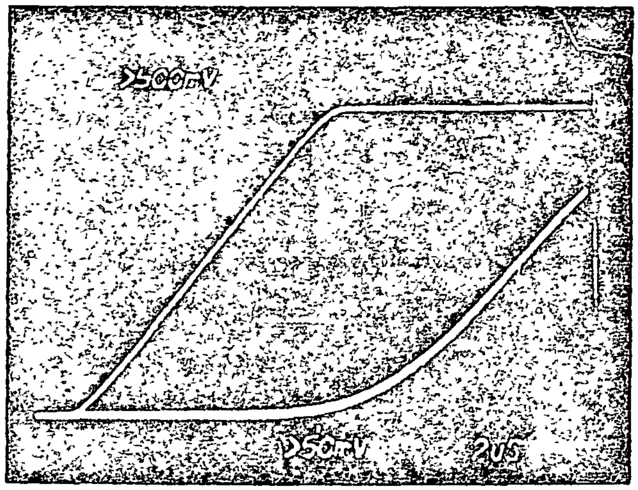
BAND #3
CHANNEL 13

DELAY TIME
12.2 μSec

J.K.
H.C. DAVISON

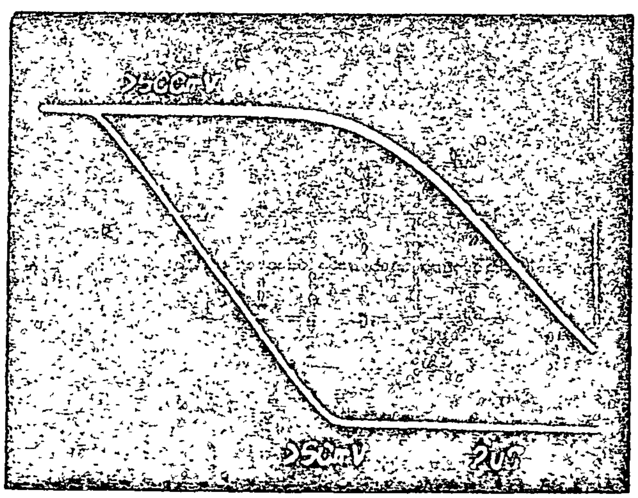
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND #3
CHANNEL 14

DELAY TIME
12.0 μSec

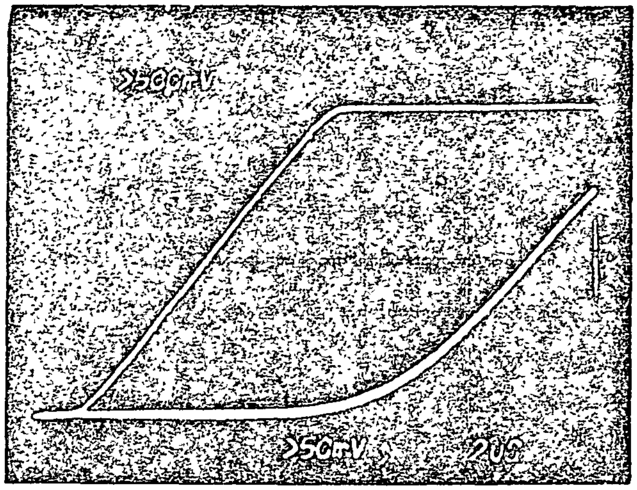


BAND #3
CHANNEL 14

DELAY TIME
11.8 μSec

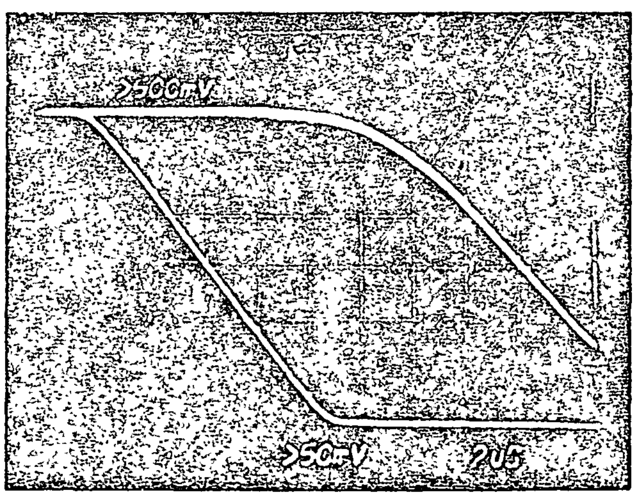
J.K.
N.C. DAVISON

DATE: AUG. 28, 1981



BAND #3
CHANNEL 15

DELAY TIME
12.4 μSec



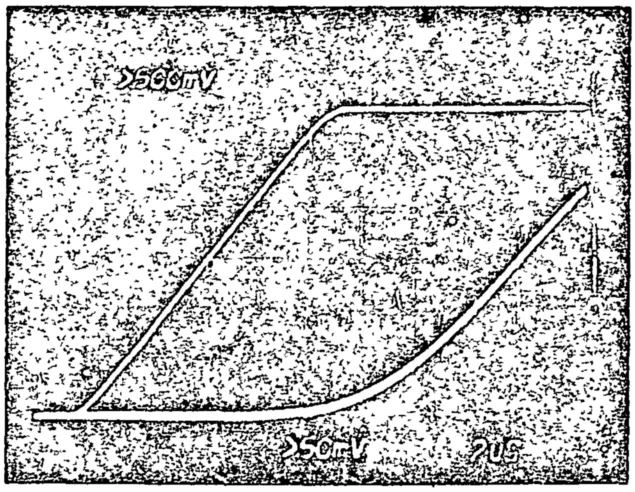
BAND #3
CHANNEL 15

DELAY TIME
12.0 μSec

J.K.
N.C. DAVISON

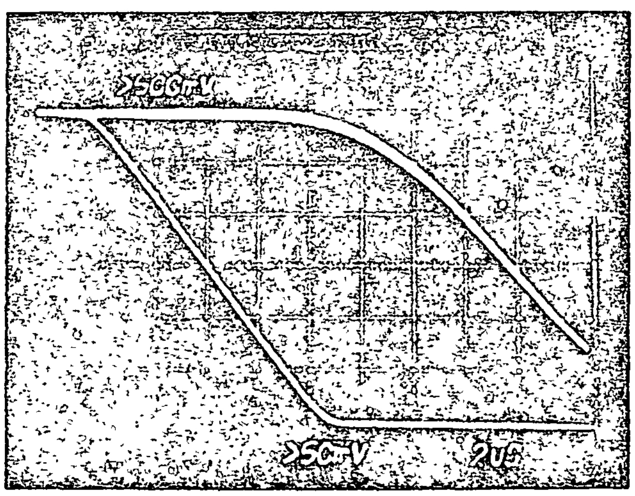
DATE: AUG. 28, 1981

ORIGINAL PAGE IS
OF POOR QUALITY



BAND ~~4~~ 3
CHANNEL 16

DELAY TIME
12.0 μSec



BAND ~~4~~ 3
CHANNEL 16

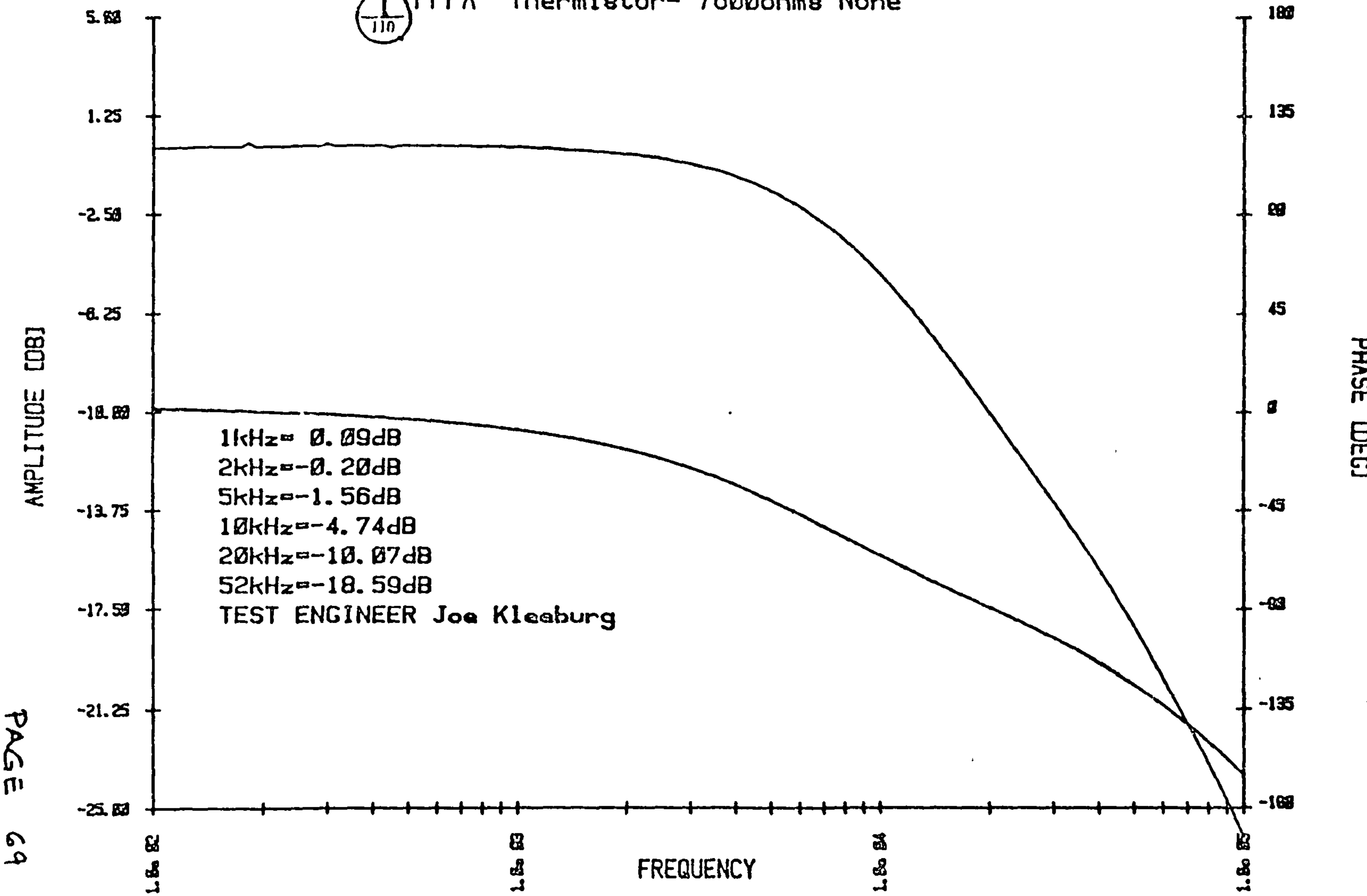
DELAY TIME
11.6 μSec

J.K.
N.C. DAVISON

DATE: AUG. 28, 1981

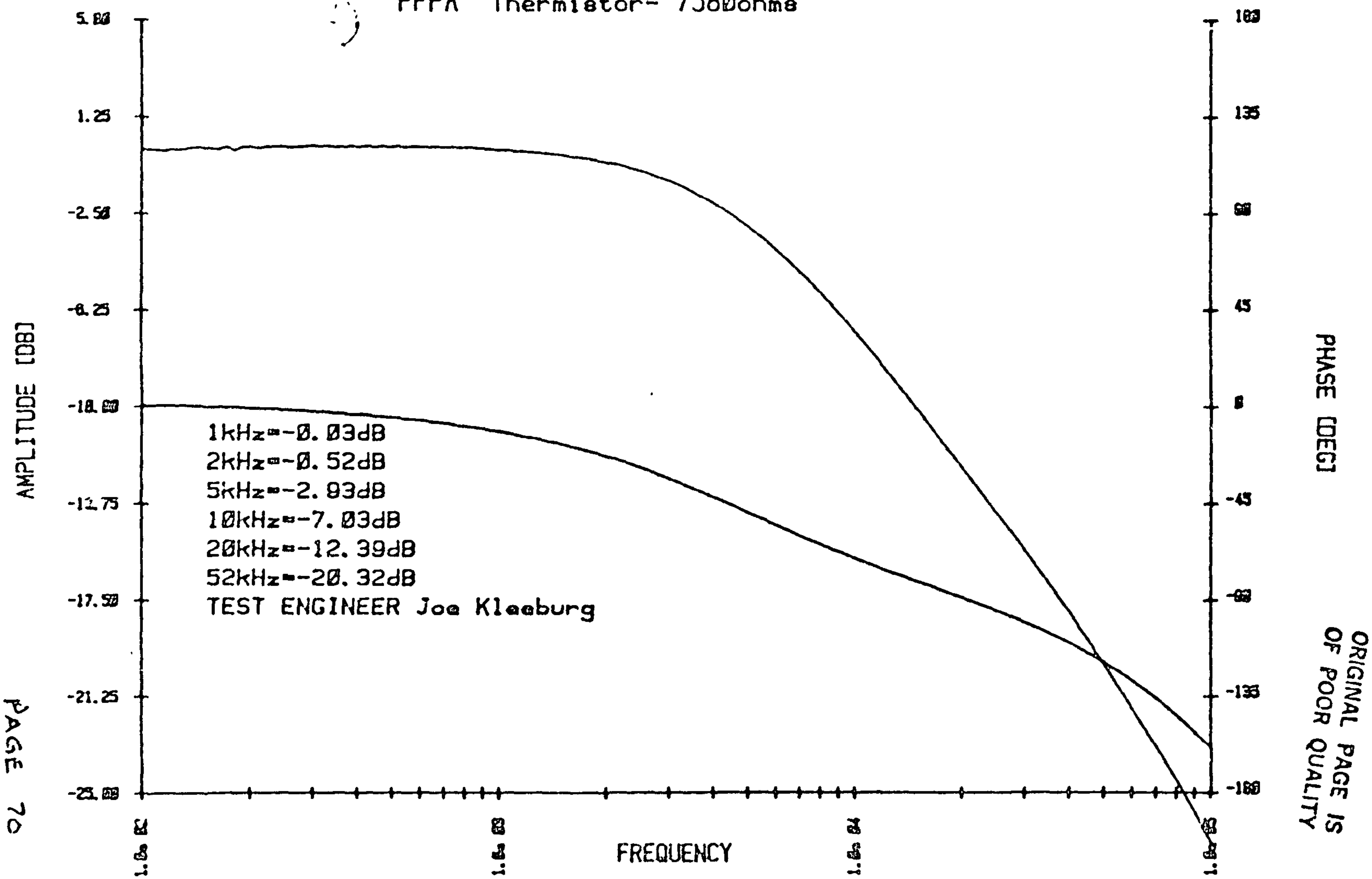
BAND 34 CHANNEL 1 August 26, 1981

110 PFPA Thermistor= 7800ohms None



BAND 3 CHANNEL 2 8/26/81

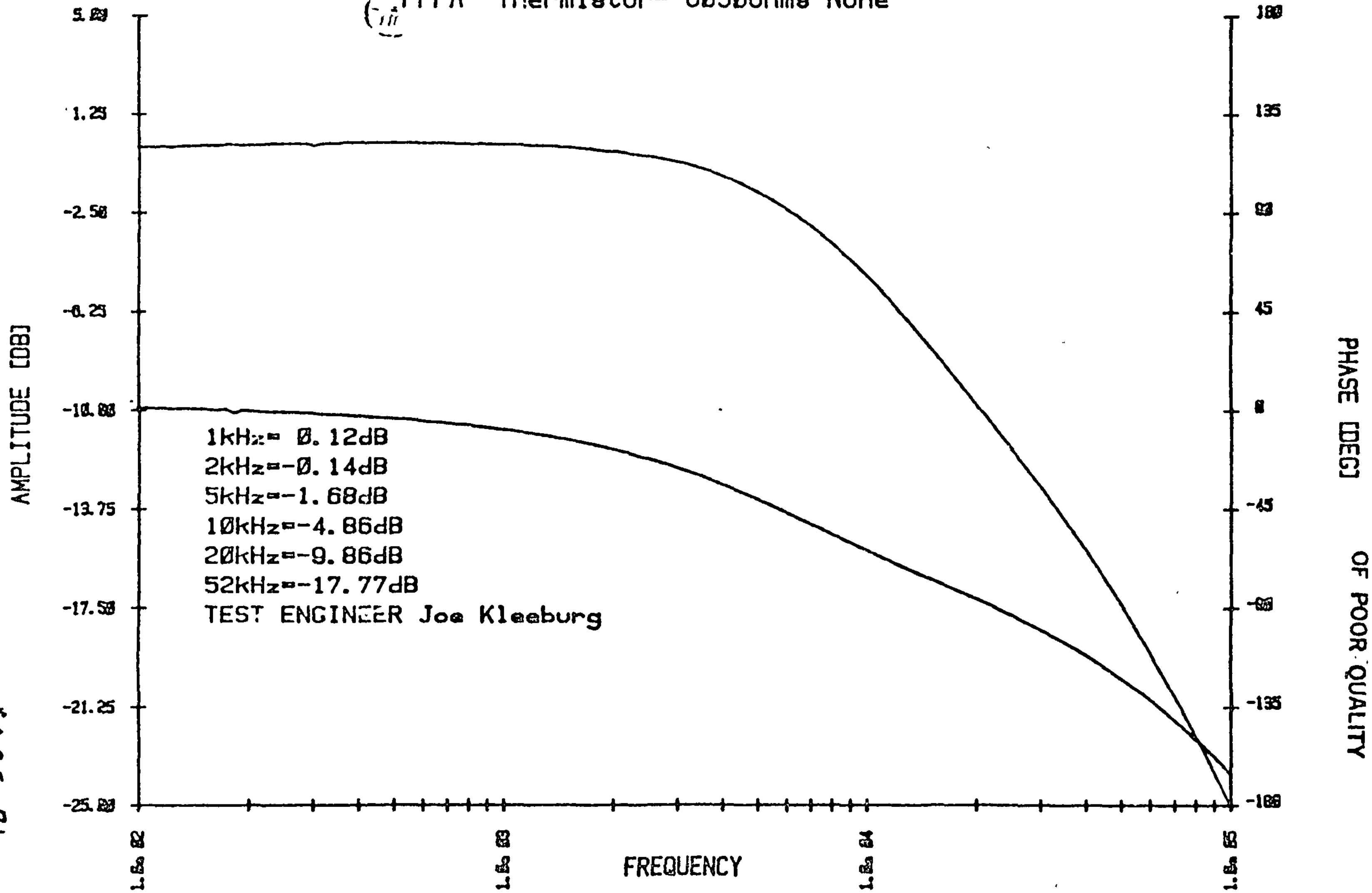
PFPA Thermistor= 7580ohms



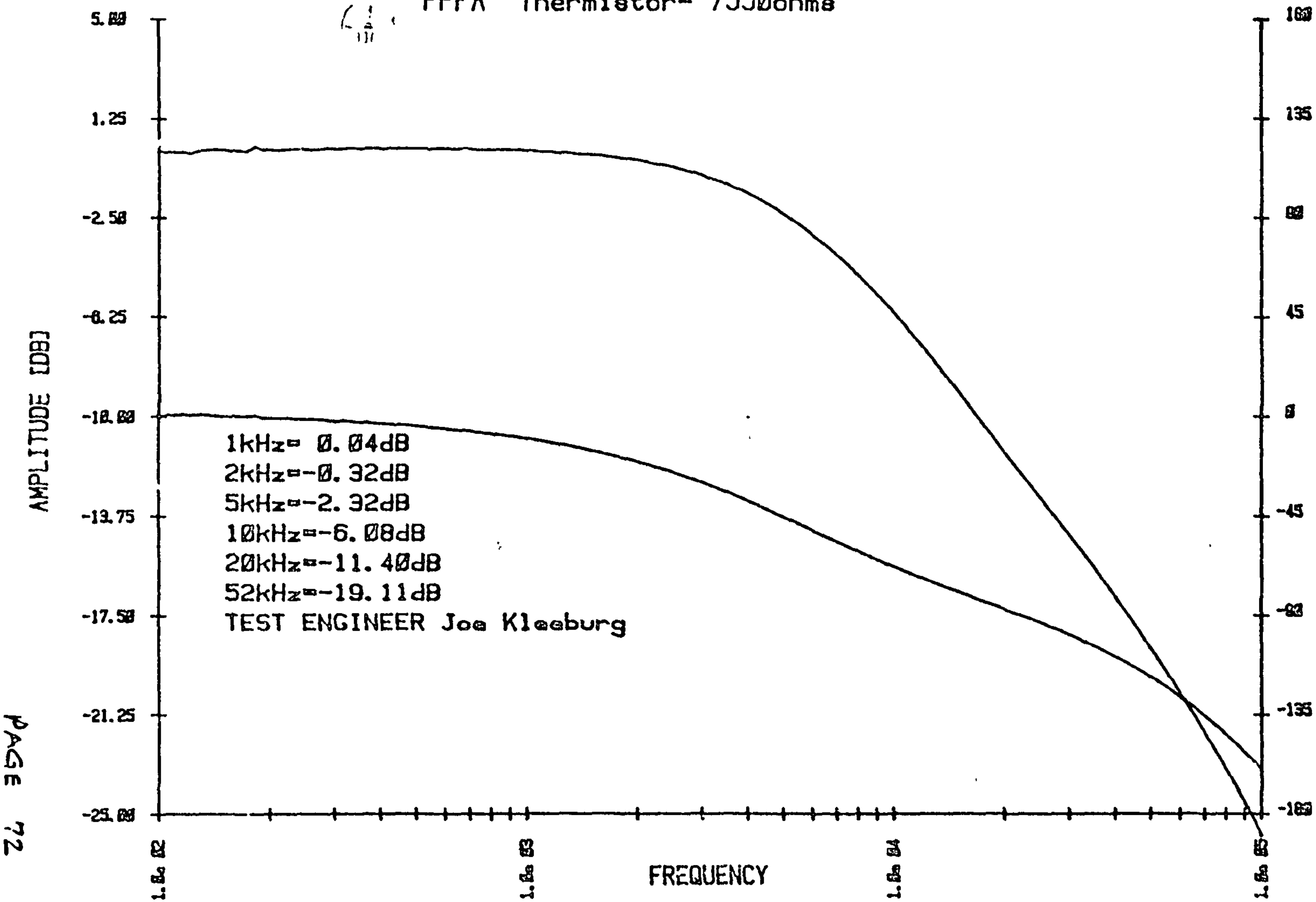
ORIGINAL PAGE IS OF POOR QUALITY

BAND ~~4~~ 3 CHANNEL 3 August 26, 1981

PFPA Thermistor= 8050ohms None

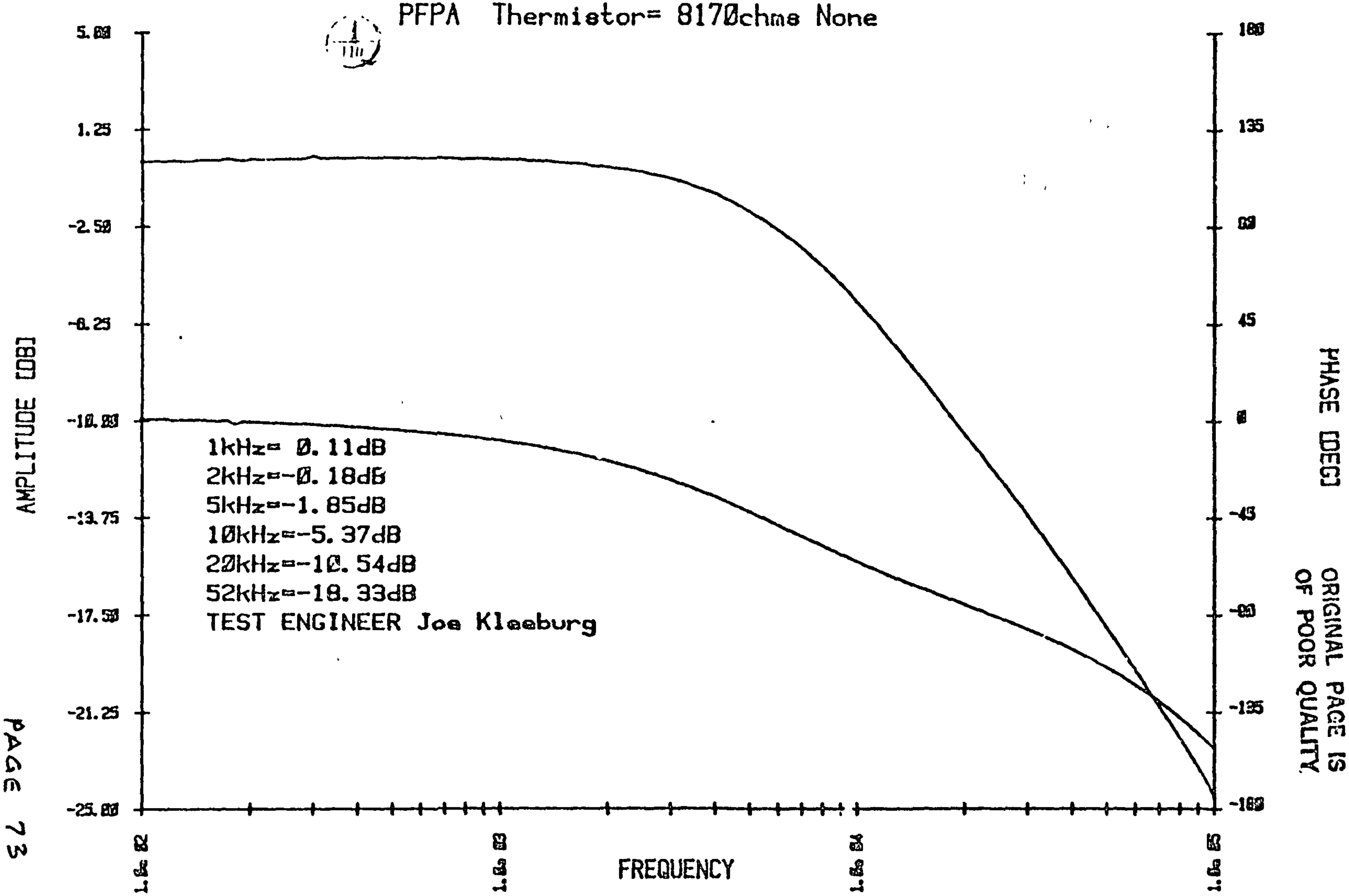


BAND 3,4 CHANNEL 4 8/26/81
PFPA Thermistor= 7550ohms

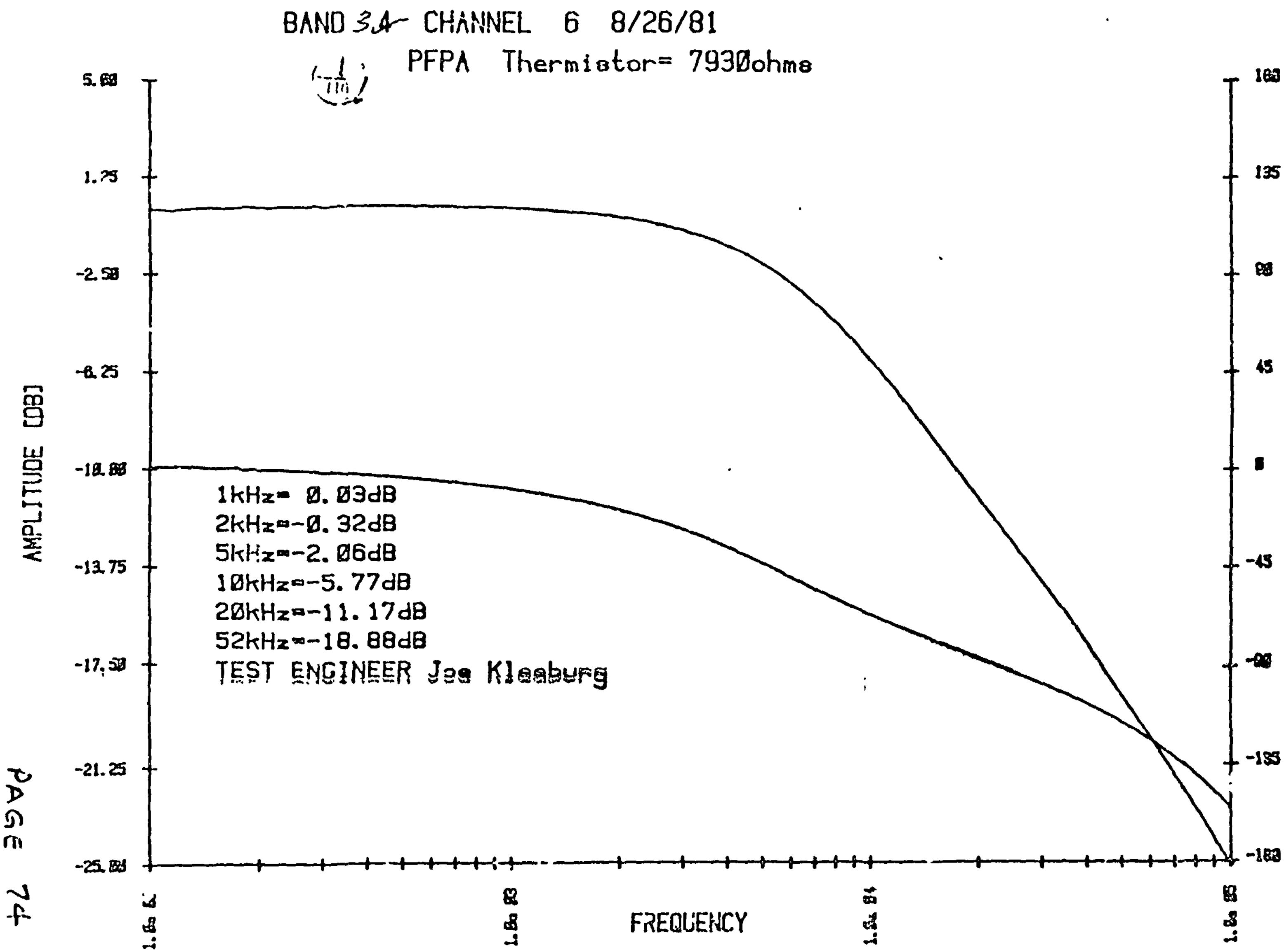


BAND 3 ~~4~~ CHANNEL 5 August 26, 1981

PFPA Thermistor= 8170ohms None



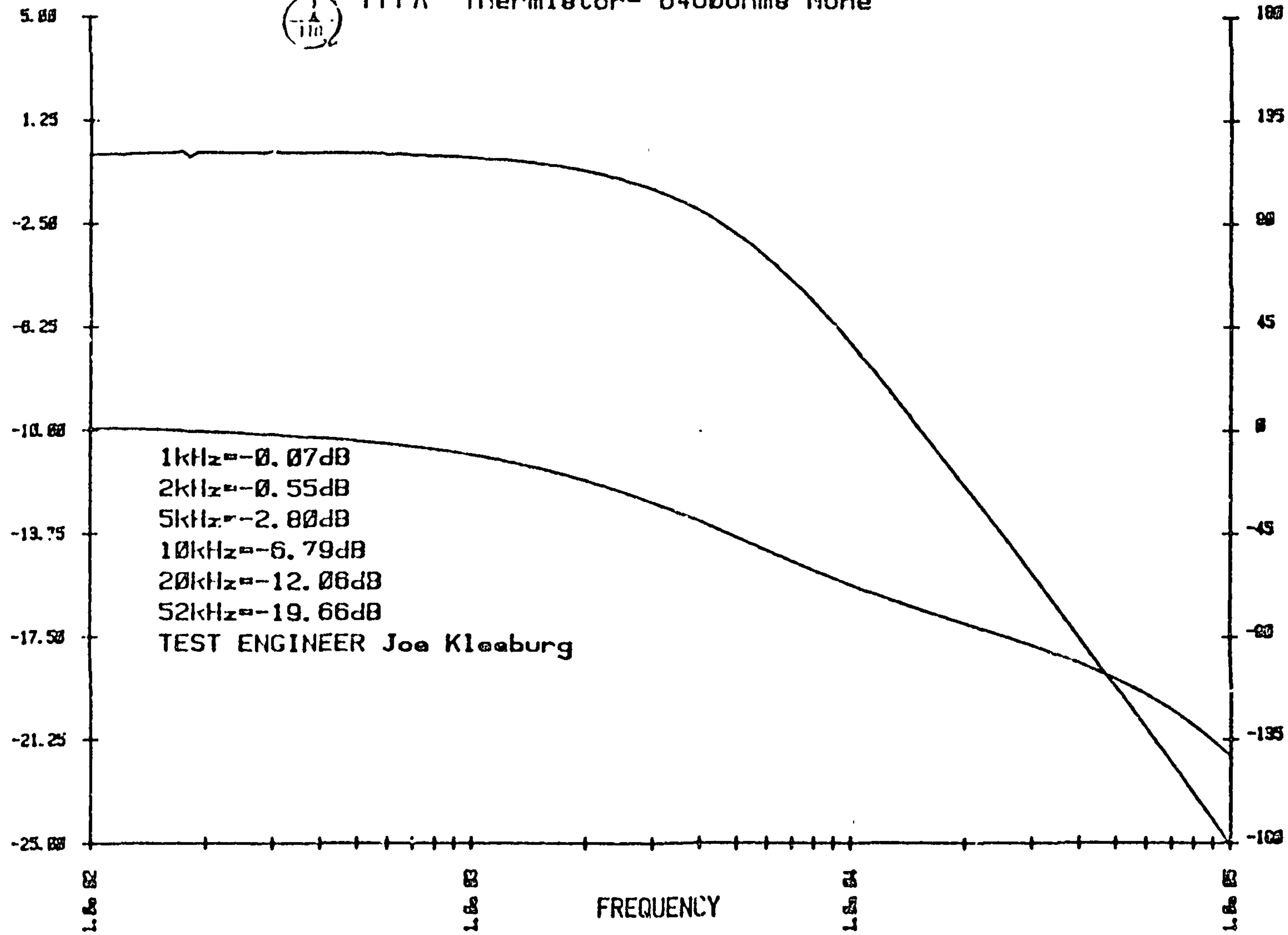
ORIGINAL PAGE IS OF POOR QUALITY



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4 3 CHANNEL 7 August 26, 1981

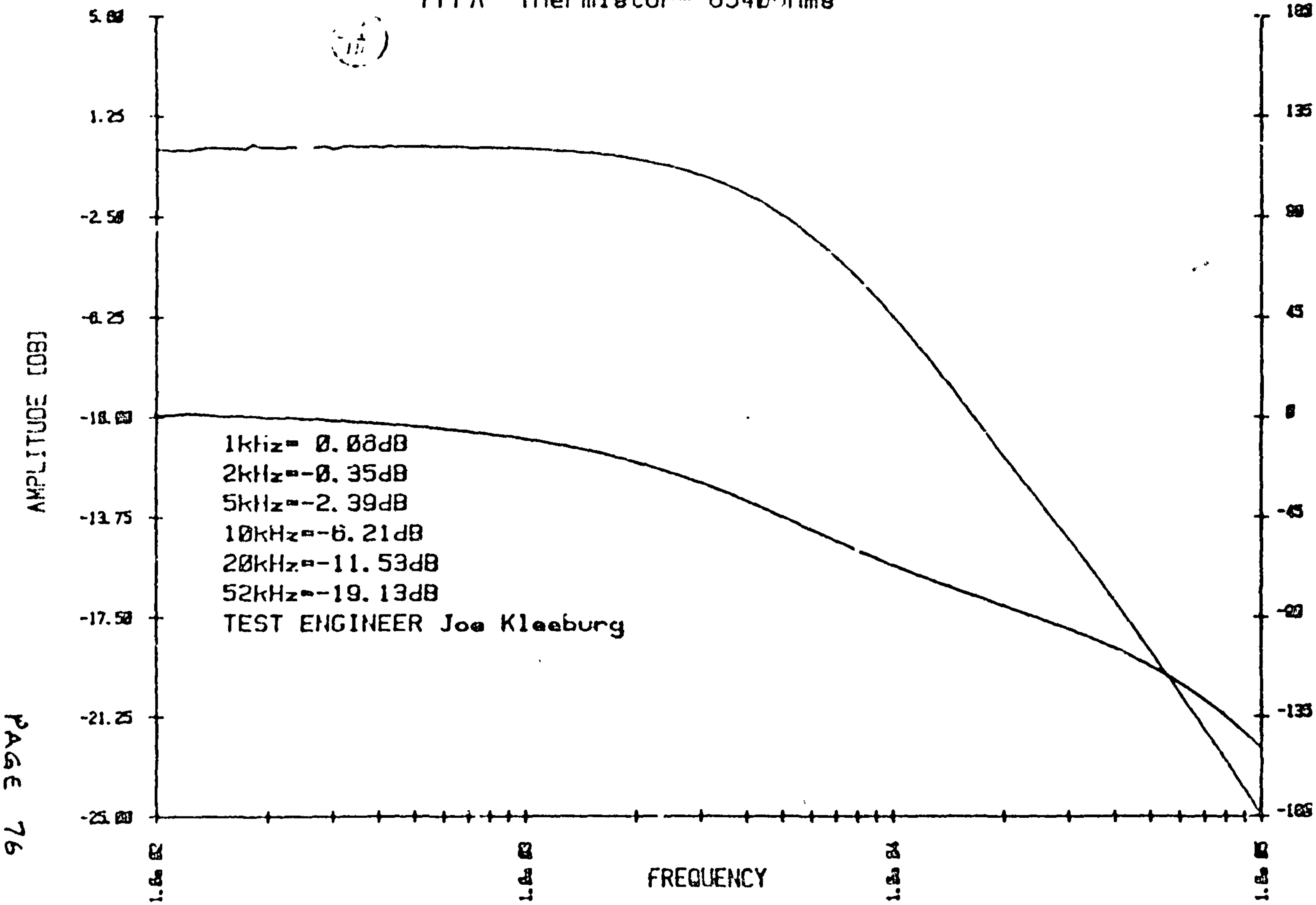
PFPA Thermistor= 8460ohms None



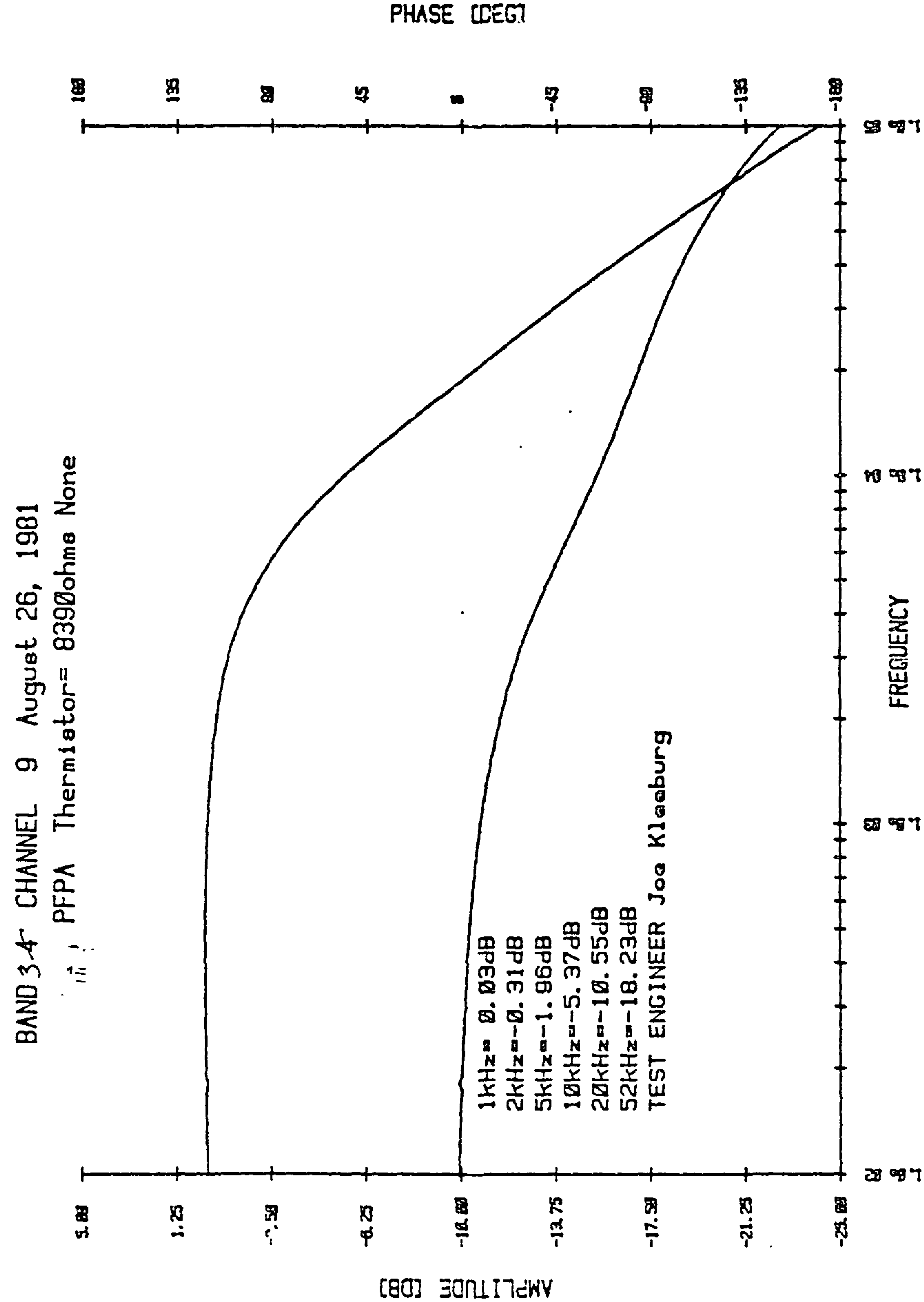
ORIGINAL PAGE IS
OF POOR QUALITY

BAND ~~4~~ 3 CHANNEL 8 8/26/81

PFPA Thermistor= 8340hms

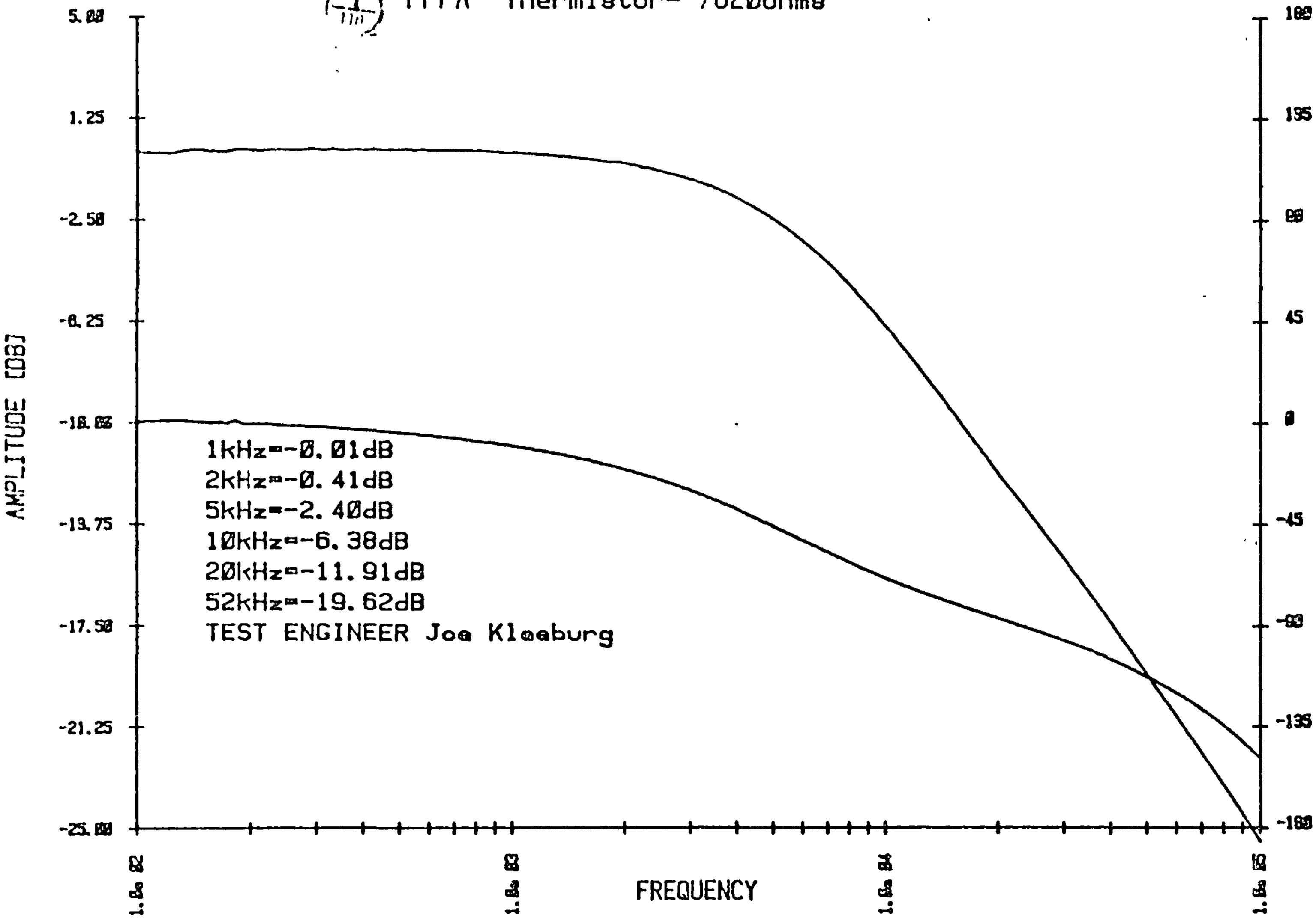


ORIGINAL PAGE IS
OF POOR QUALITY



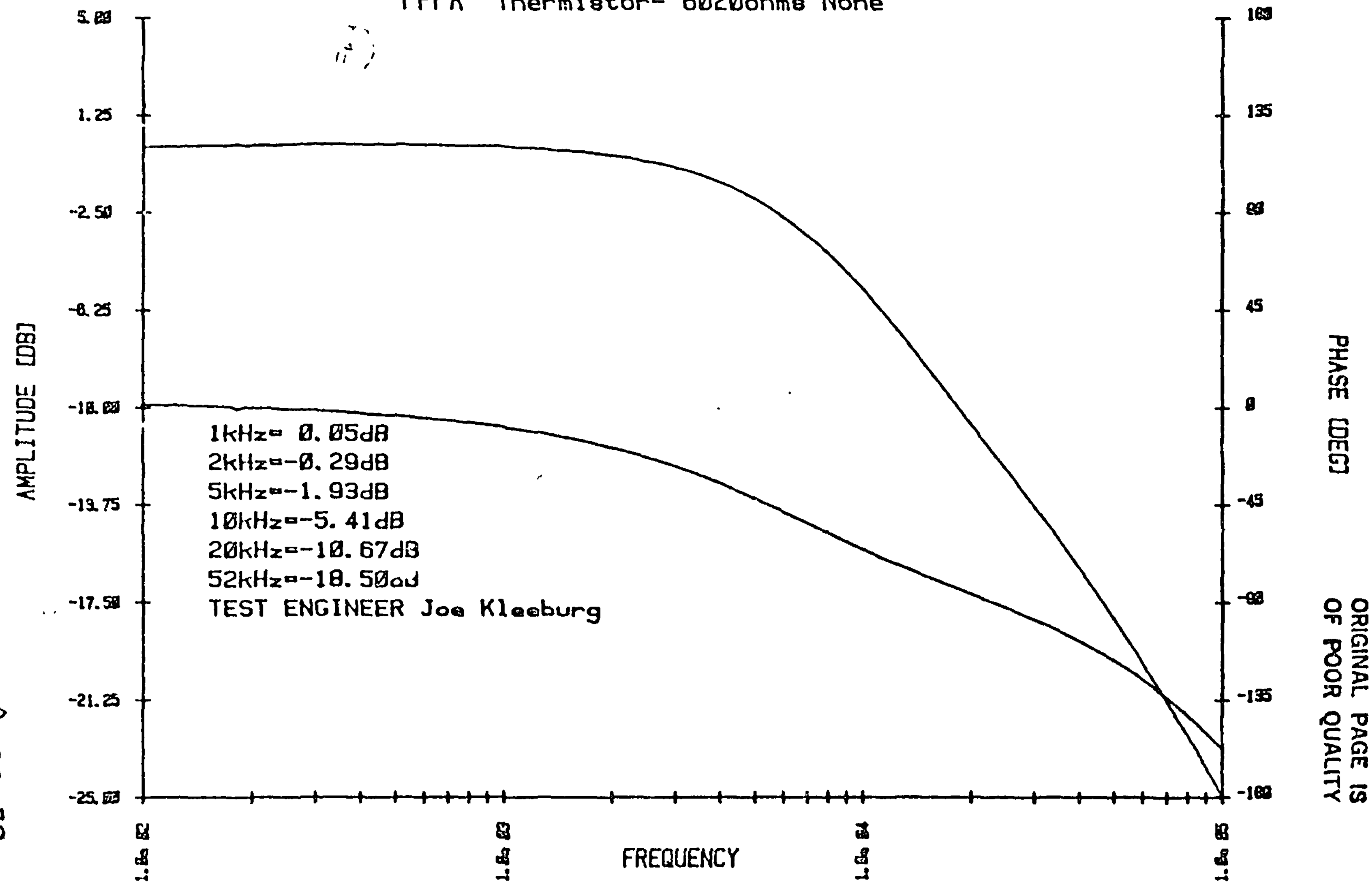
BAND 3,4 CHANNEL 10 8/26/81

(I) PFPA Thermistor= 7820ohms

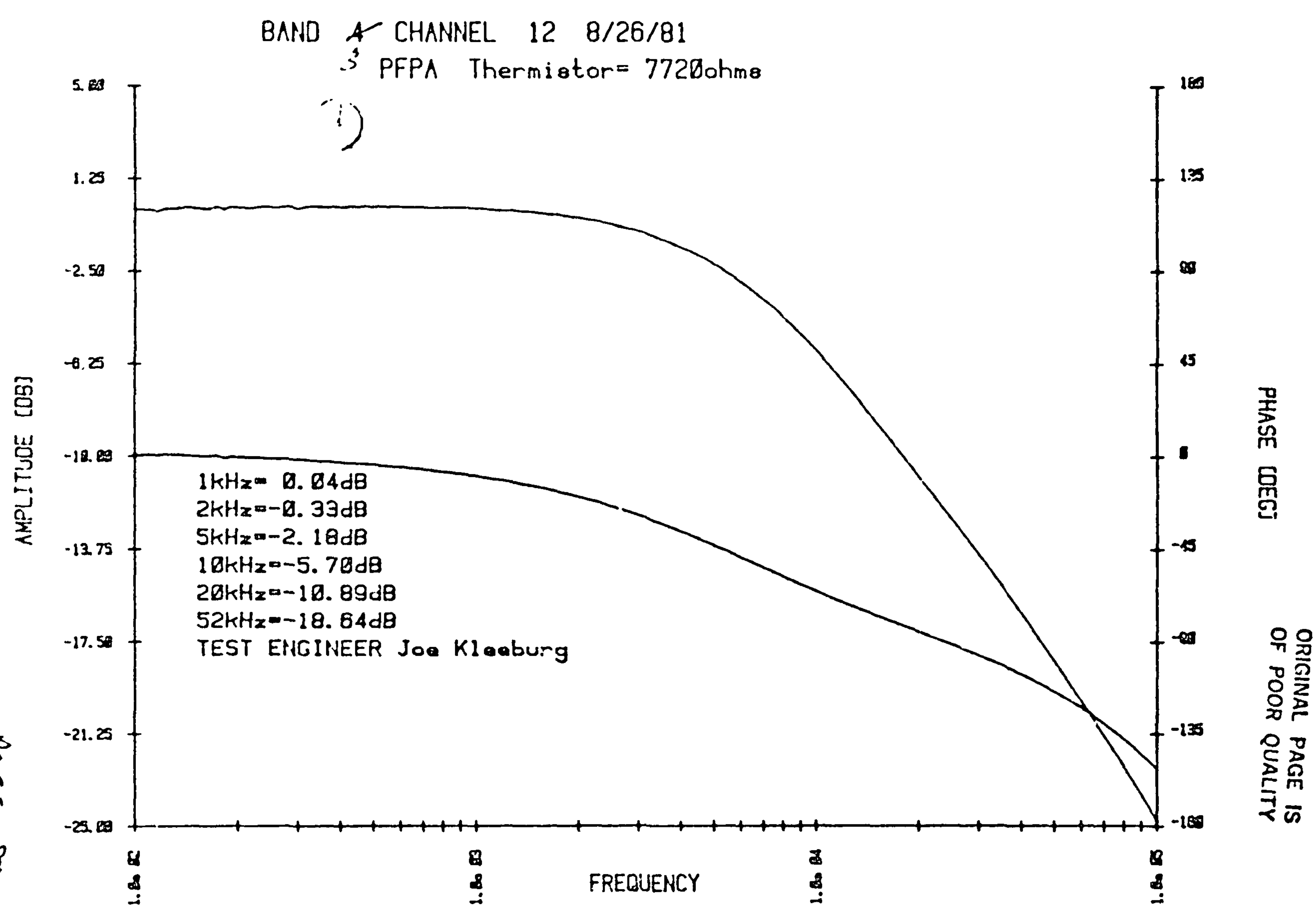


ORIGINAL PAGE IS OF POOR QUALITY

BAND ~~A~~ 3 CHANNEL 11 August 26, 1981
PFPA Thermistor= 8020ohms None

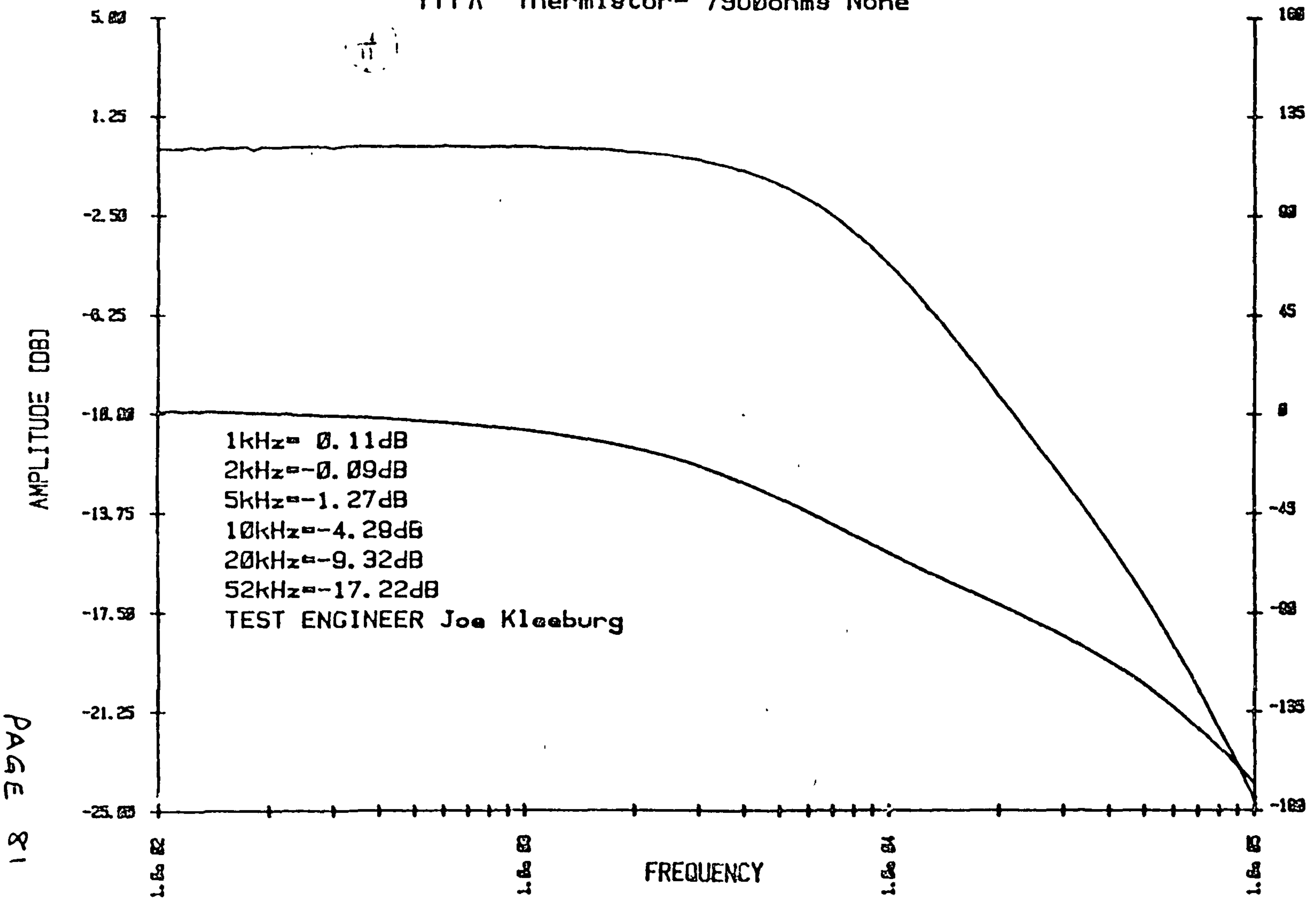


ORIGINAL PAGE IS OF POOR QUALITY



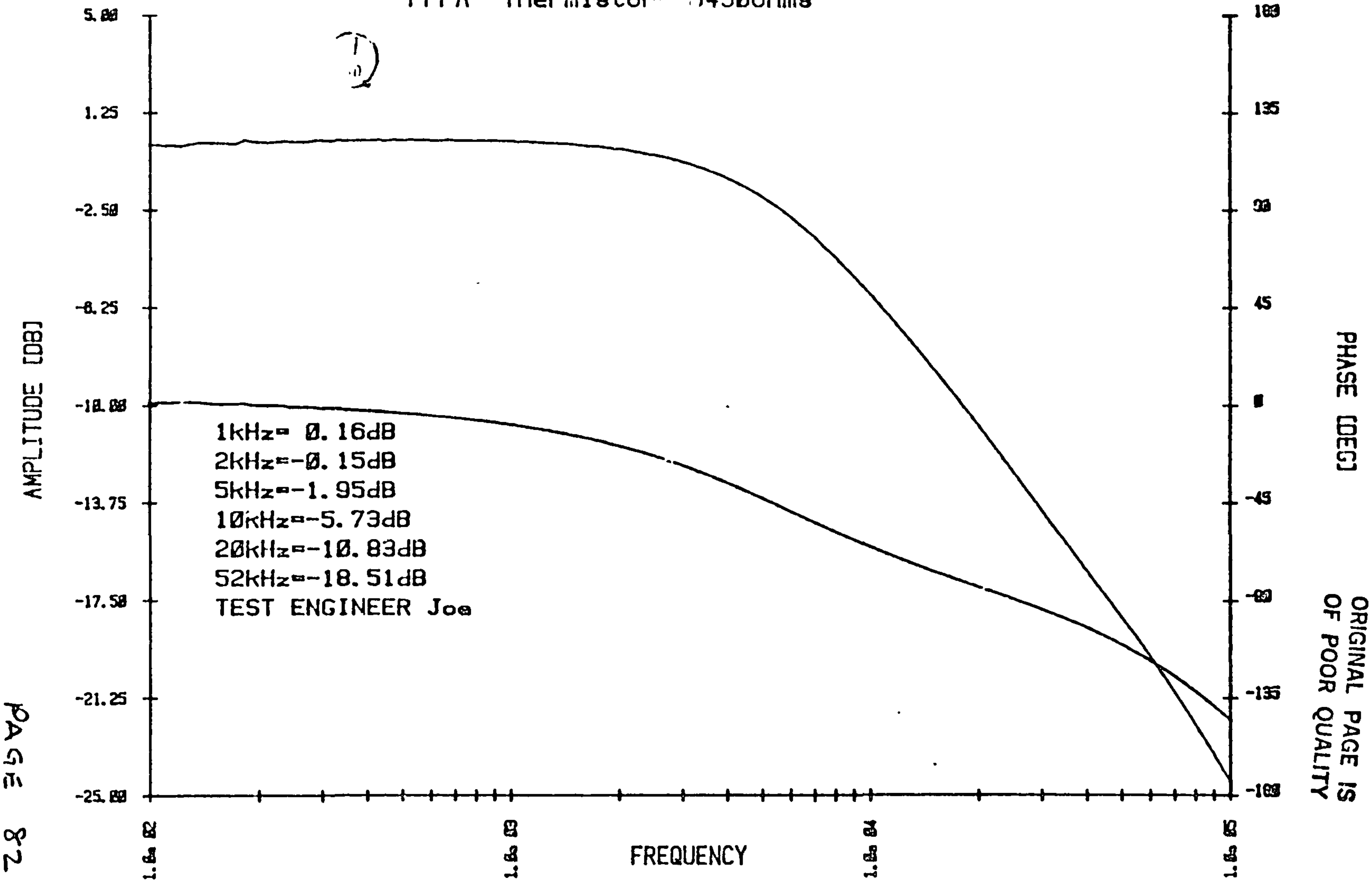
ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4 3 CHANNEL 13 August 26, 1981
PFPA Thermistor= 7960ohms None

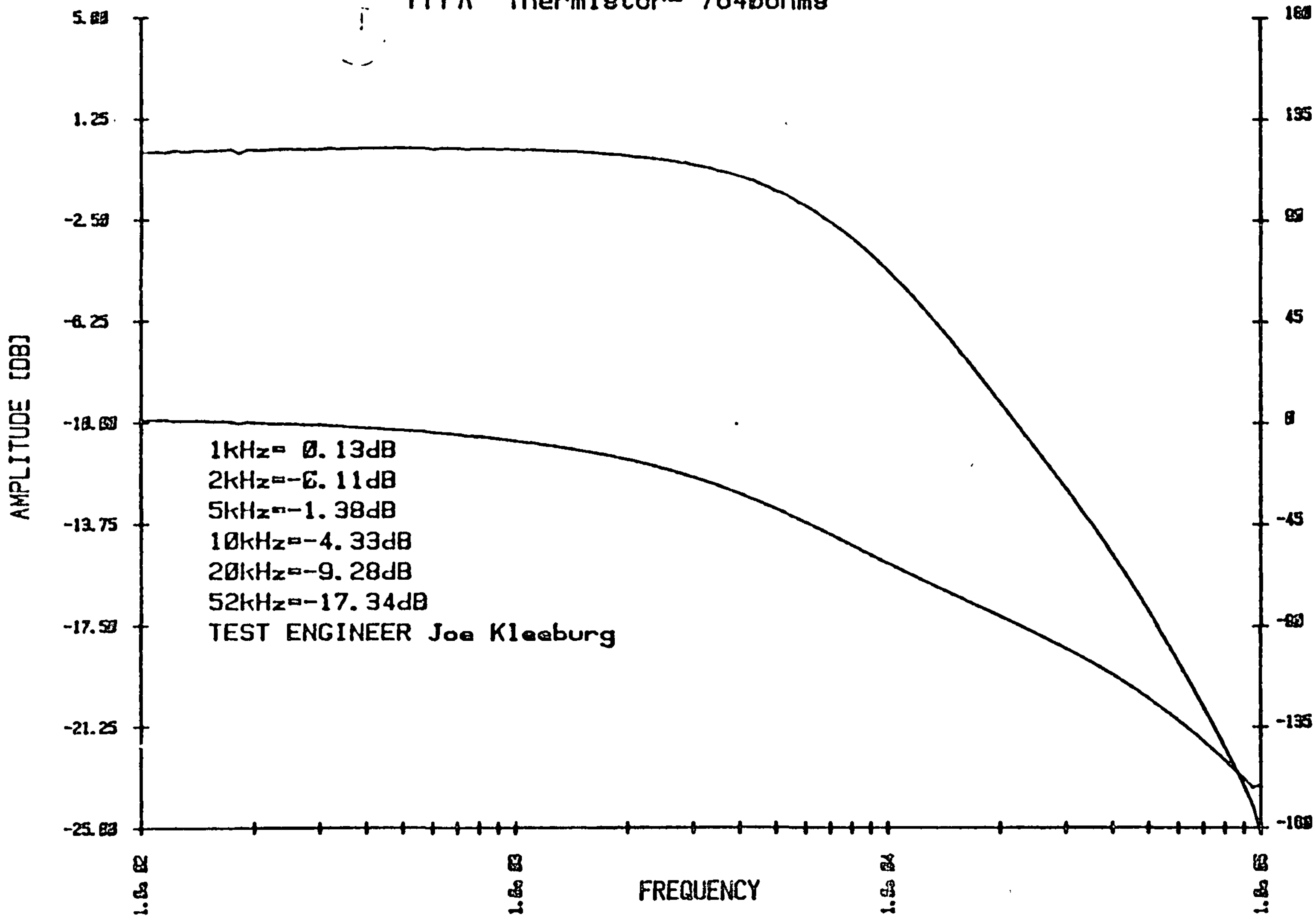


ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4 CHANNEL 14 8/26/81
PFPA Thermistor= 8450ohms



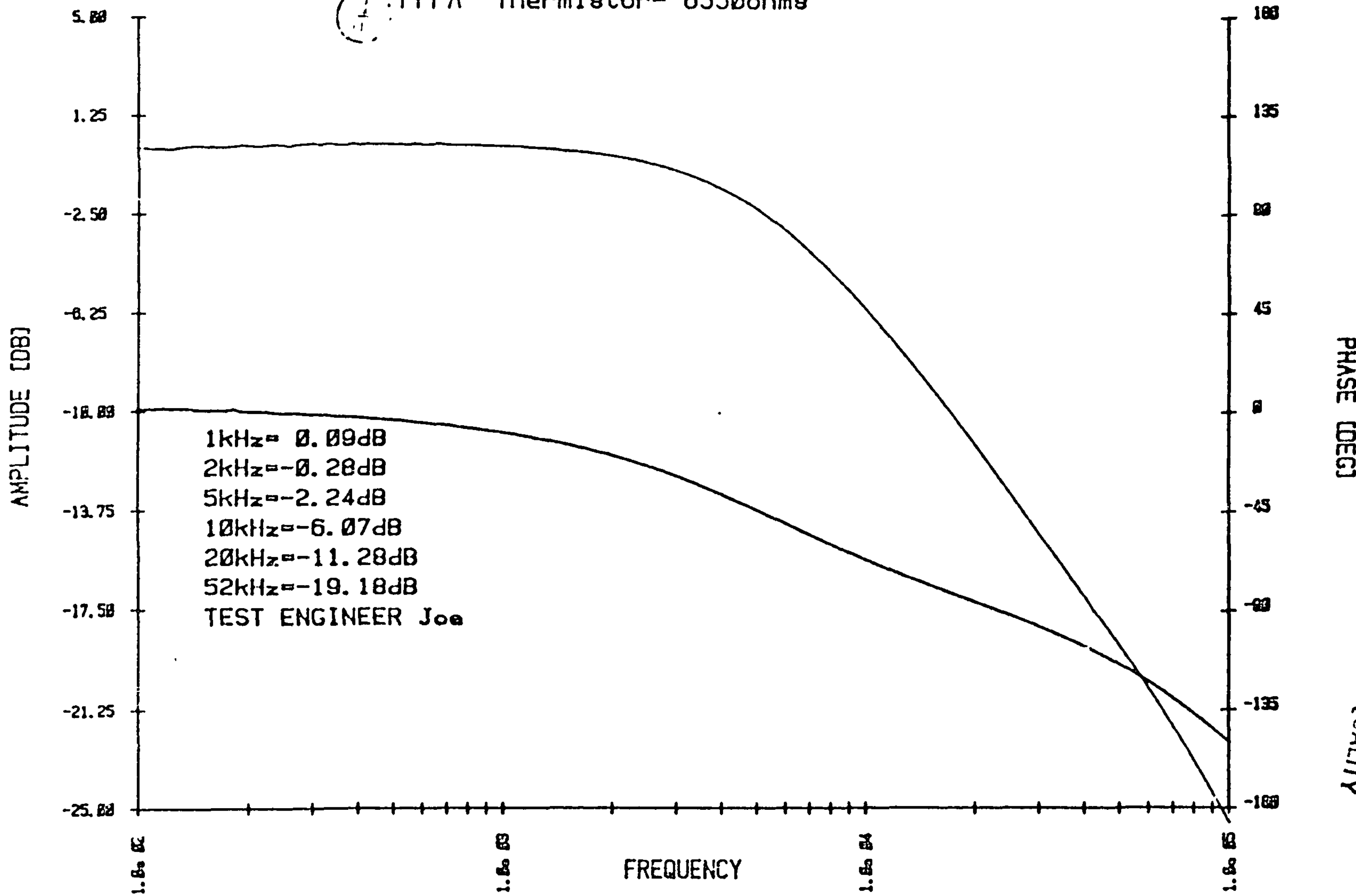
BAND ~~4~~ 3 CHANNEL 15 8/26/81
PFPA Thermistor= 7840ohms



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 3 ~~4~~ CHANNEL 16 8/26/81

PFPA Thermistor= 8330ohms



ORIGINAL PAGE IS
OF POOR QUALITY

TM PFPA

FLIGHT BAND #4

S/N 401

10/5/81

ORIGINAL PAGE IS
OF POOR QUALITY

INTRODUCTION

The following pages summarize the data obtained for the Band 4 TM Flight Full Band Assembly (P/N 50797) as of October 5, 1981

The enclosed data has been collected from half-band, post amplifier, and full-band acceptance test data records. It is presented here to make it available in a single package.

Neville C. Davison, III
FPA Test Supervisor

D.M. Randall
F.P.A. R.E.A.

ORIGINAL PAGE IS
OF POOR QUALITY

INDEX

*Retest data taken after Hybrid Pre-Amp was replaced.

LTR. EFFECTIVITY	SYM	REVISIONS DESCRIPTION	DATE	APPROVED	
	A	INITIALLY RELEASED 8-22-79			
5 S/N 001 & UP	B	REPLACES REV A WITH CHANGE AS REQUESTED BY ECR TM1202/01 TO UPDATE TEST PROCEDURE	1-7-80	HWS	
51065 S/N 001 & UP	C	Incorporated TM1357/01.(1-6) See Revision Notice.	80-2-13	mm	
51065 S/N 002 & SUBS	D	INCORPORATED TM1433/01 R1 AND TM1420/01. SEE REVISION NOTICE.	80-4-21		
51065 S/N 002 & SUBS	E	Incorporated E.O. 9965 and E. O. 1684A.	80-11-19	BM	
51065 S/N 003 & SUBS	F	Incorporated E.O. 2068A.	80-11-19	BM	
51065 SN 002 & SUBS	G	INCORPORATED TM2220/01.(1) ADDED TO PARA 4.9. INCORPORATED EO'S 2972A & 2978A.	81-3-31		
51065 S/N 003 & SUBS	H	Incorporated E.O. 2769A	81-5-14		

OPER. No. 1300, AHR
50904-34 S/N 201 } POST-AMP

OPER. No. ~~1400~~ 2600, AHR
50797 S/N 401 } PRE-AMP

REVISION STATUS THIS PRINT
NOT MAINTAINED AFTER
JUN 1 1981
DO NOT USE THIS PRINT
UNLESS YOUR ORDER OR AUTHORIZATION SPECIFIES THE REVISION LEVEL SHOWN

ORIGINAL PAGE IS
OF POOR QUALITY

CONTRACT NO. NAS 5-24200

DRAWN Slowalker	1-2-80
CHECK	1-2-80
	1-3-80
	1-7-80

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company
GOLETA, CALIFORNIA

TITLE
TEST PROCEDURE, TM BANDS 1-4
SIGNAL CHANNEL ELECTRONICS

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

SCALE | SHEET 1 OF 20

ORIGINAL PAGE IS OF POOR QUALITY

1.0 SCOPE

This document describes the functional test of the Silicon Detector and Preamplifier Assembly, 50797, and the Post-amplifier Circuit Board for Bands 1-4, 50904. Together these make up 16 complete channels, or one spectral band, of TM signal electronics. In preparation for the test, the 50797 assembly is mounted in the 75729 bonding and test fixture. A modulated LED is focussed on each individual detector. The postamp boost and rolloff resistors are set for each channel to provide proper frequency response from 100 Hz to 52 kHz and transient response to a 10 μs ramp. Wideband noise is measured for each channel. Crosstalk is measured from each channel to all other channels at 50 kHz. Once a preamp and postamp assembly are tested together, it is intended that they be installed in the same band location in the TM instrument.

2.0 APPLICABLE DOCUMENTS

2.1 SBRC Documents

The following documents specify the electrical assembly design and are for use in identifying details necessary in testing.

Drawings

50797	Silicon Detector & Preamplifier Assembly
50805	Electronic Diagram, Silicon Detectors & Preamplifiers
50904	PWB Assembly, Postamplifier, Band 1-4
52732	Parts, Electronics Select, TM
50905	Elec. Diagram, Postamplifier, Band 1-4
75918	Detector Array Alignment Fixture Assembly
76600	Full Band Test Set
76601	Voltage to Current Converter
76602	Optical Fiber

ORIGINAL PAGE IS
OF POOR QUALITY

3.0 TEST EQUIPMENT REQUIRED (OR EQUIVALENT)

3.1 Full Band Test Set, SBRC Drawing 76600

The test set contains connectors to mate with the Detector and Preamplifier Assembly, a connector to accept the post-amplifier circuit board, a selector switch to monitor preamp and postamp outputs and potentiometers for adjusting the boost and rolloff resistance.

3.2 Oscilloscope

Tektronix type 547 oscilloscope with a 1 A7A plug-in, or equivalent.

3.4 Wave Analyzer

Hewlett Packard 3591A selective voltmeter, or equivalent, is used to measure crosstalk.

3.5 True RMS Voltmeter

Hewlett Packard 3400A, or equivalent, to measure frequency response and wideband noise.

3.6 Detector Array Alignment Fixture Assembly, SBRC Dwg. 75918

This assembly contains a microscope with a photometric eye-piece which allows the light from an optical fiber to be focussed onto an individual detector element.

3.7 Optical Fiber, SBRC Dwg. 76602

An optical fiber about 2 feet long is used between the light emitting diode (LED) and the alignment fixture assembly so the LED drive signal current will not be picked up by the high impedance focal plane circuitry.

3.8 Light Emitting Diode

Laser Diode Laboratories, type 639AS3831.

3.9 Voltage-to-Current Converter, SBRC Dwg. 76601

This box drives the LED with a current proportional to its voltage input.

ORIGINAL PAGE IS OF POOR QUALITY

3.10 Function Generator

Wavetek type 147 drives the voltage-to-current converter for the frequency response and crosstal tests.

3.11 Pulse Generator

Data pulse type 116 drives the voltage to current converter for the transient response test.

3.12 Integrator/Averager

PAR type 162 is used to improve the signal to noise ratio during the transient response test. The model 164 gated integrator plug-in is used.

3.13 Plotter

Hewlett Packard type 7044A is used with the Integrator/Averager.

3.14 Automatic Equipment

The following equipment is used when testing is performed in other than the manual mode.

3.14.1 Network Analyzer - The HP 3042 Network Analyzer consists of a 3305B Synthesizer, 3570A Network Analyzer and a 9825S Desk Top Computer.

4.0 PROCEDURE

4.1 Inspection

Check to see that nominal component values have been installed on the postamp board at C33-48, R1-16, R17-32, R33-48, R65-80 and R81-96. The nominal values are shown on the postamp assembly drawing 50904 as a function of the intended band number (1-4). The assembly drawing also gives a 52732 Select List Dash Number for each select component also as a function of intended spectral band. The final selected value must be chosen from the values in the list.

4.2 Setup

Attach the 50797 Detector Preamplifier Assembly (mounted in the bonding and test fixture) to the baseplate of the Detector Array Alignment fixture. Focus the microscope on detector element number 1 of 16. Connect the sinewave generator, voltage-to-current converter, LED and optical fiber. Locate the LED as far as possible from the detector-preamp assembly. Insert the postamp board into the test set socket.

4.3 Supply Current

Apply $\pm$21V $\pm$0.5V to the test set following the indicated polarity. Limit the currents to 200 mA. Turn on the supply and record the currents as indicated on the supply meters.

4.4 Offset Adjustment

Connect the test set postamplifier high and low outputs to the + and - inputs of the oscilloscope preamplifier. Adjust the nominal 20 KΩ offset resistor in each channel to produce a differential offset voltage, $V_{OH} - V_{OL}$, of 0 $\pm$ 1V. Record the offset voltage and resistor value. The focal plane assembly must be dark for this test.

4.5 Low Frequency Gain Adjustment

Connect the true-reading rms voltmeter to the oscilloscope preamplifier output. Adjust the sinewave generator to produce a 4 v $\pm$ 1 v pk-pk 100 Hz undistorted sinewave on the scope. In each band select the channel whose feedback resistor is closest to the nominal value (1.0 X 10^9 ohms). Adjust the pre-gain resistors on the postamp board so that the gain value for each of the other channels matches that of the selected channel $\pm$ 5%. Resistors are to be replaced at the conclusion of this test. Record the final resistor values.

NOTE: When testing Band 4 only, postamp board resistors R33 through R48 (Post-gain resistors) must be lifted from the circuit board at one end. Otherwise a 4V pk-pk signal will not be attainable. Resistors are to remain lifted throughout the remainder of this test.

4.6 Frequency and Transient Response Adjustment

Measure the response to a 10 μs ramp using the pulse generator, voltage-to-current converter, light emitting diode, optical fiber and microscope. Adjust the boost control on the test box for flattest response in the 30 to 500 μs region after the ramp. Now reconnect the function generator and set the rolloff control on the test box for -3.0 db at 52 kHz. These controls are interactive so several iterations may be required.

The final setting should result in the transient response reaching final value within 1% after 60μS and within 1.5% after 35μS. Record the maximum overshoot (limit = 10%) and the 2 to 98% risetime (limit = 20μS). The frequency response should be -(3 +0/0-0.5) dB at 52 kHz. Record the boosted frequency response on the data sheet for the boost and rolloff settings obtained. Plot the transient response using the Integrator/Averager and the plotter.

It may be necessary to add capacitance at C33-C48 to meet the requirement. If capacitance is added, record the values on the data sheet. If no capacitor is required, enter 0 for value and make note that capacitor was not needed.

4.7 Wideband Noise

With the boost and rolloff set as in paragraph 4.6, measure the wideband noise on the true rms meter. It shall be less than (2.4 pA) (Rf) where Rf is the feedback resistor value in the channel being tested. Record the noise on the data sheet.

4.8 Crosstalk - Using the wave analyzer at the 1A7A signal output and the sinewave light source driver with the voltage-to-current converter, measure the crosstalk from each channel to its four nearest neighbors at 50 kHz. (Channel 1 has only 2 nearest neighbors: 2 and 3. Channel 2 has 3: 1, 3 and 4. Channel 3 has 4: 1, 2, 4, and 5. Also record the average crosstalk from each channel to its 11 non-neighbors. The measured crosstalk shall be less than 1% (-40 dB) for nearest neighbors and less than 0.1% (-60 dB) for non-neighbors.

4.9 Ground Continuity and Isolation

Turn off power. Remove connectors. Measure <1l ohms between J1-16 and:

J1-27	J2-6
J1-23	J2-10
J1-1	J2-31
J1-5 ~~J1-6~~	J2-27

Record maximum reading on Data Sheet.

Measure >1 MΩ between J1-16 and

J1-18	J2-15
J1-11	J2-21

Check Data Sheet O.K.

Measure >1 MΩ between J1-16 and the FPA aluminum mounting fixture.

Check Data Sheet O.K.

Measure <25Ω between J1-16 of odd channels and J1-16 of even channels for Bands 1, 2, 3 and 4. Check data sheet O.K.

4.10 Time Delay

Measure the Time Dealy between the 50% points of the led drive current waveform transition and the corresponding channel output waveform transition. Display both waveforms on the oscilloscope, using a dual trace plug-in with external sync and 2µS/CM sweep time. Photograph the rise and fall separetely for each channel. Record the delays on the Data Sheet. They shall be TBD ±0.5µS.

ORIGINAL PAGE IS OF POOR QUALITY

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 7

ORIGINAL PAGE IS OF POOR QUALITY

5.0 QUALITY ASSURANCE PROVISIONS

5.1 Notification of QA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by QA Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All Flight Assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

5.4 Failures

Problems/failures encountered during testing of flight hardware shall be handled in accordance with Thematic Mapper Product Effectiveness Plan HS236-0066A.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer, QA Engineer, and Design Engineer. When the QA Engineer has not witnessed the test, he should sign the data sheet after it is reviewed by the Design Engineer. A typical data sheet format is included at the end of this procedure.

6.2 Distribution of Test Records

After the test data sheet is signed, place one (1) copy in the traveling file, one(1)copy and the original in the Engineering file, and give one (1) copy to QA.

ORIGINAL PAGE IS OF POOR QUALITY

TEST DATA RECORD

Detector Preamplifier Assembly 50797, S/N 401
contains 51015 assemblies S/N 203 and 206-1,
odd and even channels, respectively.

Postamplifier Circuit Board Assembly 50904, S/N 201
Intended for TM Spectral Band 4.
Feedback Resistor values from data sheets for specification 16306.

FR 8323 Data

ODD		Even	
1	.97 x 10⁹ Ω	2	.91
3	1.05	4	.95
5	1.02	6	1.05
7	1.06	8	.94
9	.84	10	.98
11	.91	12	.84
13	.88	14	.84
15	.84	16	.83

4.3 Power Supply Current
Limit: 200mA
+ 21V 175 mA
- 21V 175 mA

Test Engineer C. R. Lane Date 09-26-81

Test Supervisor [signature] Date Sept. 30, 1981

VERIFY DATA COMPLETE

Quality Control Stamp 118 P.G. Ryan Date 10/1/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 9

ORIGINAL PAGE IS
OF POOR QUALITY

4.4

Channel	Resistor	Value	908600-( )	Measured Offset Voltage	Limit: 0.0 ± 1.0 V
1	R17	20.5K	-252	+600 mV	
2	R25	19.6K	-250	+550 mV	
3	R18	21.0K	-253	+1 V	
4	R26	19.6K	-250	-50 mV	
5	R19	22.1K	-255	+1.5 V	*
6	R27	19.6K	-250	+100 mV	
7	R20	21.5K	-254	-60 mV	
8	R28	22.1K	-255	+2.5 V	*
9	R21	21.0K	-253	+60 mV	
10	R29	17.4K	-245	+600 mV	
11	R22	18.7K	-248	+800 mV	
12	R30	20.0K	-251	+1.5 V	*
13	R23	23.2K	-257	+1.3 V	*
14	R31	21.5K	-254	+1 V	
15	R24	18.7K	-248	+150 mV	
16	R32	22.6K	-256	+ 1 V	

Test Engineer [signature] Date 09-26-81

Test Supervisor [signature] III Date Sept. 30, 1981

Quality Control Stamp 118 D P.S. Ryan Date 10/1/81

118 ENTERED IN ERROR 10-9-81

12:2 CH 5, 8, 12, 13 OUT OF SPEC 10-9-81 REF FR 8327

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 10

FORM NO 3122 ... DIETERICH-POST CLEARPRINT 1000H

4.5 Pregain Resistors E.O. 3442A & E.O. 3654A

LIMITS:

Band 1: 4.87K to 16.2K
2. 3.01K to 11.8K ~~2. 4.12K to 11.8K~~
3. 2.49K to 24.3K ~~3. 2.61K to 9.90K~~
4. 4.02K to 100K ~~4. 8.23K to 100K~~

Channel	Resistor Value	908600-( )
1	R81 6.04 K	-201
2	R89 5.11 K	-194
3	R82 6.65 K	-205
4	R90 4.02 K	-184
5	R83 6.98 K	-207
6	R91 5.62 K	-198
7	R84 7.15 K	-208
8	R92 5.36 K	-196
9	R85 4.42 K	-188
10	R93 5.36 K	-196
11	R86 5.62 K	-198
12	R94 4.22 K	-186
13	R87 4.64 K	-190
14	R95 4.42 K	-188
15	R88 4.42 K	-188
16	R96 5.11 K	-194

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer [signature] Date 07-24-81

Test Supervisor [signature] Date SEPT. 30, 1981

Quality Control Stamp 118 ACCEPT [signature] Date 10/1/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 11

ORIGINAL PAGE IS
OF POOR QUALITY

4.6 Transient Response

Maximum excursion from final value after time $t_0 + t$ where t_0 is the time when the response reaches 2% of final value.

	t = ~~35μS~~ 30μs Limit = 1.5%	t + 60μS Limit = 1.0%
Ch 1	1.5%	.2%
2	1.2	.2
3	.5	.1
4	1.2	0
5	2.0 *	1.0
6	1.0	.2
7	1.5	.5
8	.9	.1
9	1.0	.8
10	.2	0
11	.5	.2
12	1.0	.2
13	2.0 *	2.0 *
14	2.0 *	.8
15	2.0 *	.5
16	1.9 *	0

Test Engineer C. R. LANG Date 9-28-81

Test Supervisor Merill Clawson III Date SEPT. 28, 1981

Quality Control Stamp 1212 PJ Ryan Date 10-21-81

SEE FR# 58322

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 12

OVERSHOOT	Ch. 1	3.5%	RISETIME	Ch. 1	14.50 μS
	2	5.6%		2	13.50 μS
	3	6.0%		3	12.50 μS
	4	~~6.0%~~ CR 4.5%		4	13.00 μS
	5	1.5%		5	14.50 μS
	6	7.5%		6	14.00 μS
	7	3.5%		7	12.50 μS
	8	4.8%		8	13.50 μS
	9	3.0%		9	13.50 μS
	10	6.0%		10	13.00 μS
	11	6.5%		11	13.00 μS
	12	3.5%		12	14.50 μS
	13	2.3%		13	14.00 μS
	14	3.8%		14	14.00 μS
	15	3.0%		15	13.75 μS
	16	4.5%		16	13.75 μS

ORIGINAL PAGE IS OF POOR QUALITY

Limit: 10 %

Limit: 20 μ sec

Test Engineer C. L. Lane Date 09-28-81

Test Supervisor Neill Adair II Date Sept 30, 1981

ACCEPT

Quality Control Stamp 118 P. D. Ryan Date 10/1/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

ORIGINAL PAGE IS
OF POOR QUALITY

4.6 Boosted Frequency Response:

Limits (dB)	100Hz 0		1 kHz ±0.5		2 kHz ±0.5		5 kHz ±0.5	
Ch 1	0	db	.06	db	.06	db	.12	db
2	0		.08		.04		-.02	
3	0		.04		.04		.07	
4	0		.08		.04		.04	
5	0		.09		.10		.10	
6	0		.10		.10		.09	
7	0		.08		.08		.10	
8	0		.06		.02		-.00	
9	0		.09		.11		.18	
10	0		.08		.06		.14	
11	0		.11		.11		.16	
12	0		.08		.06		.02	
13	0		.14		.17		.29	
14	0		.09		.05		-.01	
15	0		.13		.11		.11	
16	0		.09		.08		.04	

Test Engineer C. L. Lane Date 09-26-81

Test Supervisor [signature] III Date SEPT. 30, 1981

Quality Control Stamp I 118 P. D. Ryan Date 10/1/81

	10 kHz +0.4 -0.6		20 kHz +0.4 -0.6		52 kHz -(3 +0/-0.5)	
Limits (dB)						
Ch 1	-.05	db	-.25	db	-2.93	db
2	-.04		-.06		-2.87	
3	.08		.00		-2.92	
4	-.04		-.16		-2.76	
5	-.28		-.54		-2.90	
6	.12		.17		-2.78	
7	-.06		-.18		-2.76	
8	-.04		-.13		-2.65	
9	.02		-.29		-2.69	
10	.15		.06		-2.80	
11	.23		.17		-2.75	
12	-.02		-.16		-2.86	
13	-.05		-.53		-2.70	
14	-.07		-.10		-2.72	
15	-.09		-.33		-2.82	
16	-.04		-.03		-2.71	

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer C. R. Lone Date 09-26-81

Test Supervisor [illegible] III Date SEPT 30, 1981

Quality Control Stamp I 118 ACCEPT R.B. Ryan Date 10/1/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 15

ORIGINAL PAGE IS
OF POOR QUALITY

* 908661-118

4.6

Channel	Boost Resistor Values	908600-( )	Rolloff Resistor Value	908600-( )
1	R1 3.32 K	-176	R65 43.2 K	908600-283
2	R9 3.40 K	-177	R73 100.0 K	908600-318
3	R2 2.80 K	-169	R66 97.6 K	908600-317
4	R10 3.65 K	-180	R74 97.6 K	908600-317
5	R3 3.40 K	-177	R67 45.3 K	908600-275
6	R11 3.01 K	-172	R75 200.0 K	908661-118 *
7	R4 2.55 K	-165	R68 100.0 K	908600-318
8	R12 3.65 K	-180	R76 200.0 K	908661-118 *
9	R5 5.11 K	-194	R69 41.2 K	908600-281
10	R13 3.48 K	-178	R77 100.0 K	908600-318
11	R6 3.40 K	-177	R70 97.6 K	908600-317
12	R14 3.48 K	-178	R78 200.0 K	908661-118 *
13	R7 3.48 K	-178	R71 35.7 K	908600-275
14	R15 4.32 K	-187	R79 200.0 K	908661-118 *
15	R8 4.02 K	-184	R72 35.7 K	908600-275
16	R16 3.83 K	-182	R80 200.0 K	908661-118 *

Test Engineer C. L. Lane Date 09-26-81

Test Supervisor [signature] III Date SEPT. 30, 1981

Quality Control Stamp 118 VERIFY DATA COMPLETE P. E. Ryan Date 10/1/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 10

ORIGINAL PAGE IS
OF POOR QUALITY

4.6

Channel	Frequency Trim Capacitor Designator	Value	908505 -
1	C33	OPEN	N/A
3	C34		
5	C35		
7	C36		
9	C37		
11	C38		
13	C39		
15	C40		
2	C41		
4	C42		
6	C43		
8	C44		
10	C45		
12	C46		
14	C47		
16	C48	OPEN	N/A

Planning Operation No. 600

Tested by C. [illegible] Date 05-30-81

Test Supervisor [illegible] Date Sept. 30 1981

Quality Inspection Stamp 118 [illegible] Date 10/1/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET

LIMIT:
..4 pA

Ch	METER	POST-AMP OUT (dB)	PRE-AMP OUT (dB)	SCOPE GAIN (dB)	PRE-AMP OUT (mV)	FEEDBACK RESISTOR X10⁹Ω	WIDEBAND NOISE(pA)
1	.60 V	+5.11	-17.24	27.55	1.92	.97	2.0
2	.63	+5.38	-17.64		1.86	.91	2.0
3	.74	+5.43	-16.56		2.47	1.05	2.3
4	.70	+5.22	-18.68		1.87	.95	2.0
5	.59	+5.13	-16.66		2.01	1.02	2.0
6	.72	+5.23	-17.43		2.22	1.05	2.1
7	.60	+5.36	-16.37		2.06	1.06	2.0
8	.65	+5.50	-17.36		1.96	.94	2.1
9	.61	+5.21	-18.48		1.67	.84	2.0
10	.71	+5.07	-17.80		2.13	.98	2.2
11	.67	+5.20	-17.42		2.08	.91	2.3
12	.65	+5.36	-18.62		1.72	.84	2.1
13	.70	+5.33	-18.23		1.95	.88	2.2
14	.63	+5.27	-18.50		1.71	.84	2.0
15	.66	+5.25	-18.61		1.79	.84	2.1
16	.61	+5.23	-17.83	27.55	1.80	.83	2.2

Test Engineer C. C. [illegible] Date 09-26-81

Test Supervisor [illegible] Date Sept. 30, 1981

Quality Control Stamp I 118 ACCEPT [illegible] Date 10/1/81

ORIGINAL PAGE IS OF POOR QUALITY

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 19

8 Crosstalk

ORIGINAL PAGE IS OF POOR QUALITY

Limit: -40 dB -60 dB

Source Channel	Nearest Neighbors								Average of Non-Neighbors
1					2	-60	3	-41	-58
2			1	-63	3	-50	4	-41	-64
3	1	-43	2	-62	4	-89 ~~-18cu~~	5	-47	-61
4	2	-46	3	-54	5	-75	6	-49	-72
5	3	-42	4	-67	6	-65	7	-44	-5'
6	4	-48	5	-74	7	-62	8	-47	-72
7	5	-45	6	-57	8	-58	9	-47	-60
8	6	-49	7	-63	9	-63	10	-48	-66
9	7	-46	8	-60	10	-57	11	-44	-58
10	8	-49	9	-61	11	-57	12	-43	-66
11	9	-47	10	-74	12	-58	13	-42	-60
12	10	-50	11	-63	13	-58	14	-43	-68
13	11	-47	12	-63	14	-57	15	-42	-58
14	12	-45	13	-60	15	-60	16	-48	-67
15	13	-46	14	-60	16	-56			-58
16	14	-47	15	-57					-66

Test Engineer C. R. [illegible] Date 09-29-81

Test Supervisor [illegible] Date SEPT. 30, 1981

Quality Control Stamp 11 918 P.B. Ryan Date 10/1/81

I 13 ENTERED ERROR

CH 1, 5, 9, 13, 15 OUT OF SPEC REF PR 8-3:2

SIZE	CODE IDENT NO	NUMBER
A	11323	16597

SCALE REV H SHEET 19

4.9 Ground Continuity and Isolation

REQUIREMENTS:

Signal GND Continuity	~~6.40~~ * SEE FR 58323 Ohms	Limit: (< 11 Ohms)	
Signal GND-PWR Gnd Isolation	OK	OK	(>1 M ohms)
Signal GND-Chassis Isolation	OK	OK	(>1 M ohms)
J1-16 ODD to J1-16 EVEN	7.5 Ω	OK	(<25 ohms all bands)

4.10 Time Delay

Channel	Rise Time	Fall Time
1	11.4 μS	12.2 μS
2	11.8 μS	12.0 μS
3	11.6 μS	12.0 μS
4	11.4 μS	12.0 μS
5	11.4 μS	11.8 μS
6	11.2 μS	11.6 μS
7	11.2 μS	11.6 μS
8	10.8 μS	11.4 μS
9	10.8 μS	11.4 μS
10	11.2 μS	11.6 μS
11	11.0 μS	11.6 μS
12	11.0 μS	11.6 μS
13	11.2 μS	11.6 μS
14	11.2 μS	11.8 μS
15	11.6 μS	12.0 μS
16	11.2 μS	11.8 μS

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer C. R. Lenz Date 09-30-81

Test Supervisor [signature] III Date SEPT. 30, 1981

Quality Control P. G. Ryan Date 10/1/81

U18

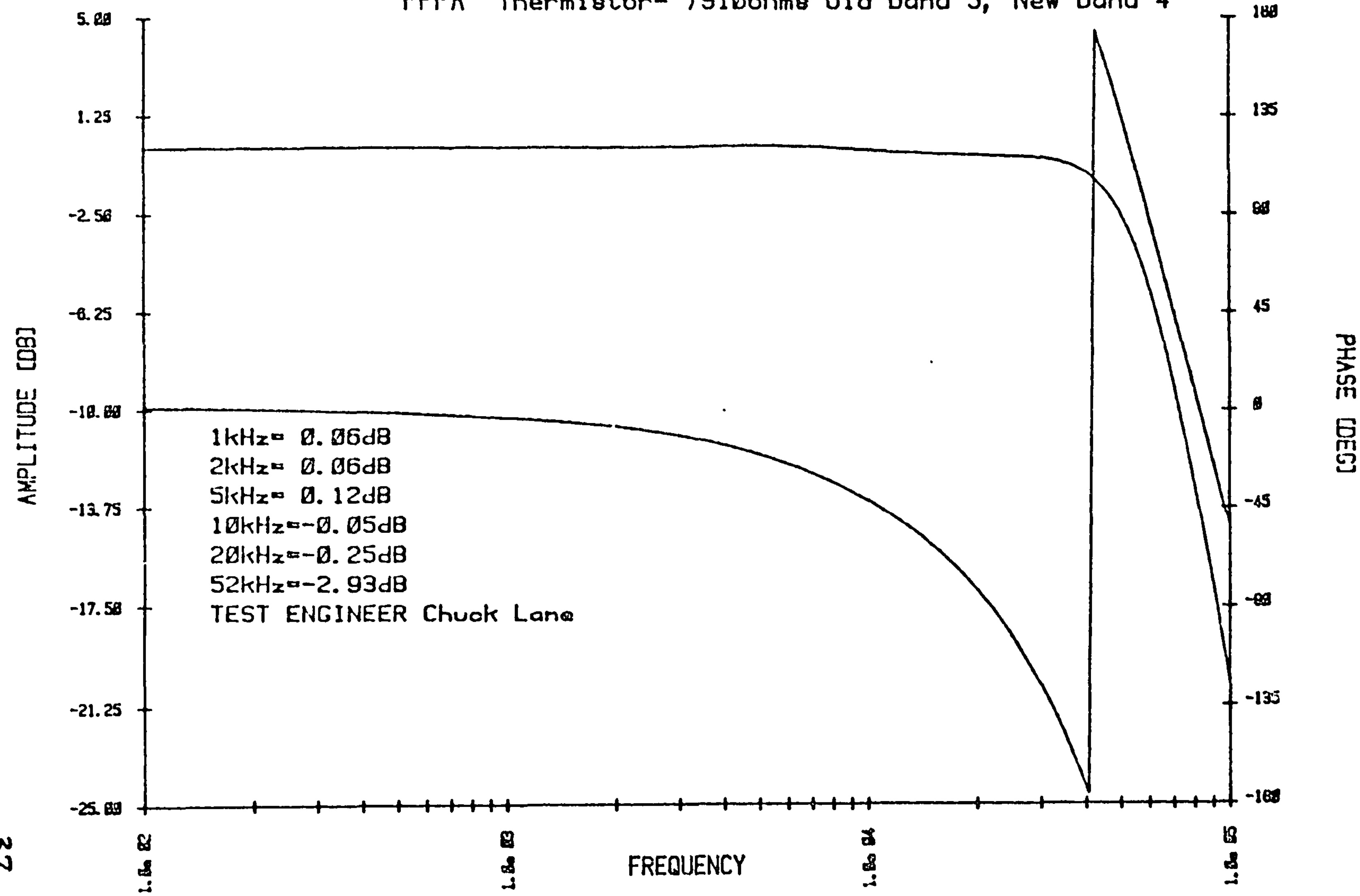
ENTERED IN ERROR

DATA OUT OF SPEC REF FR 5323

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 20

BAND 4 CHANNEL 1 09/26/81

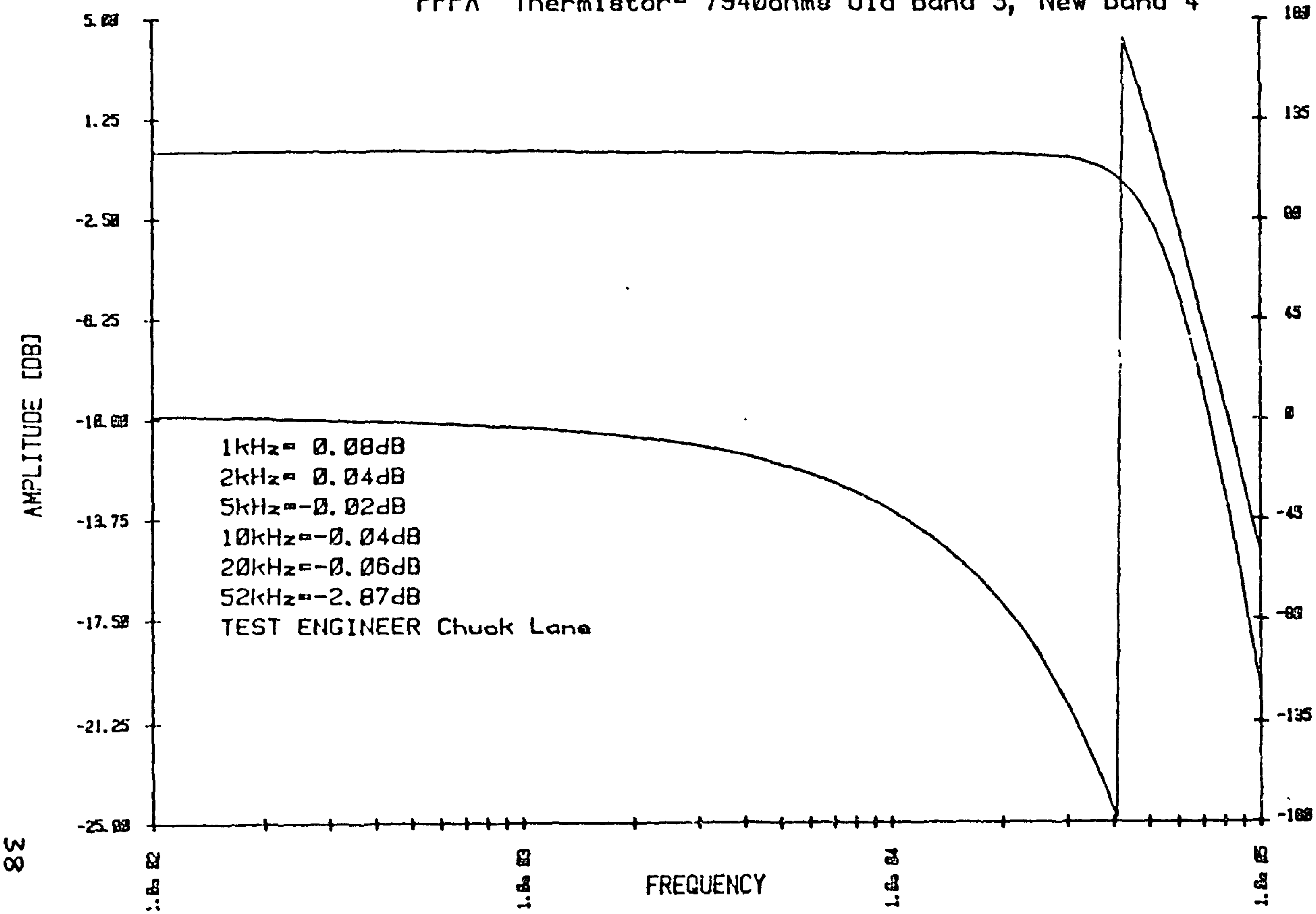
PFPA Thermistor= 7910ohms Old Band 3, New Band 4



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 2 09/26/81

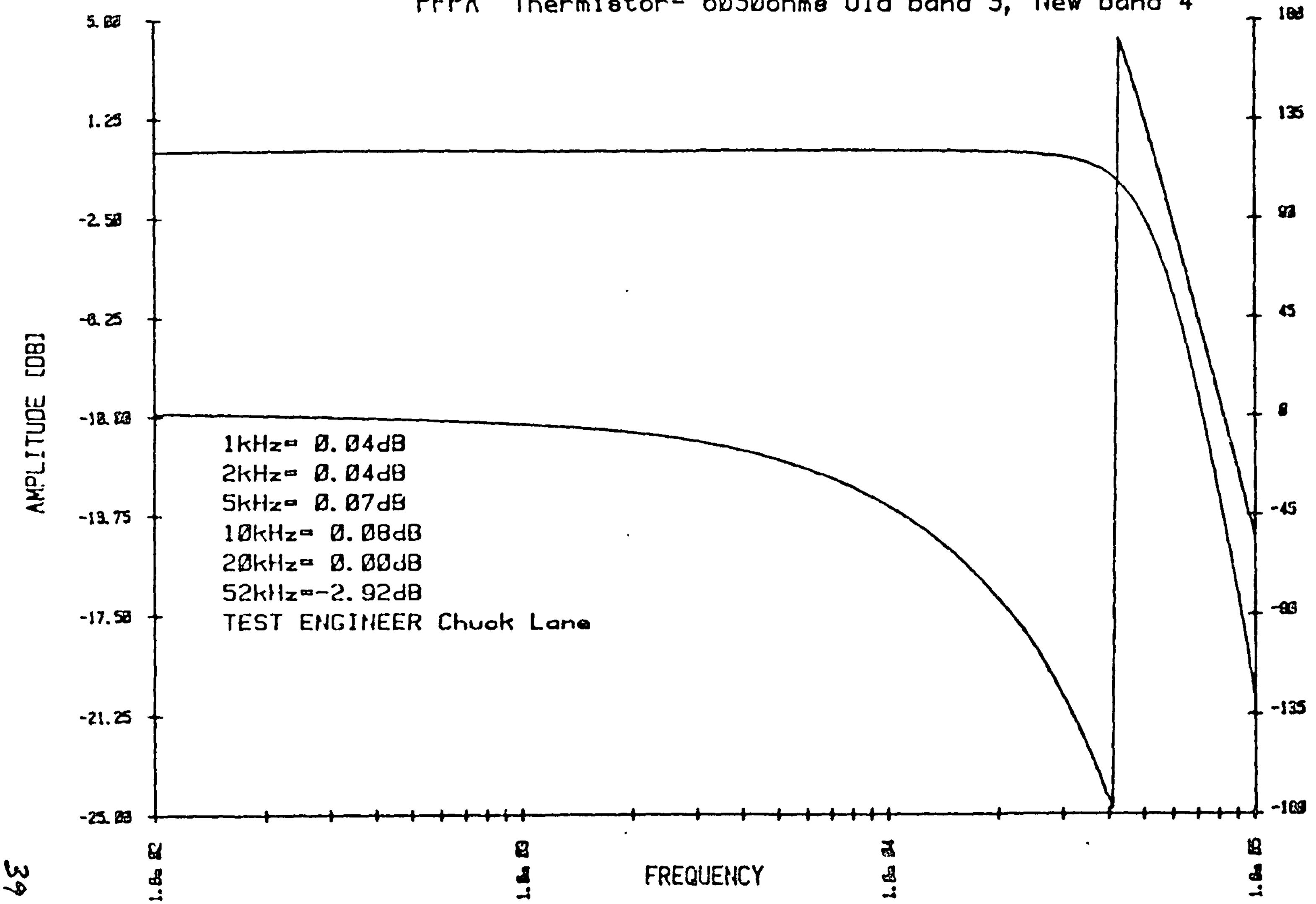
PFPA Thermistor= 7940ohms Old Band 3, New Band 4



ORIGINAL PAGE IS OF POOR QUALITY

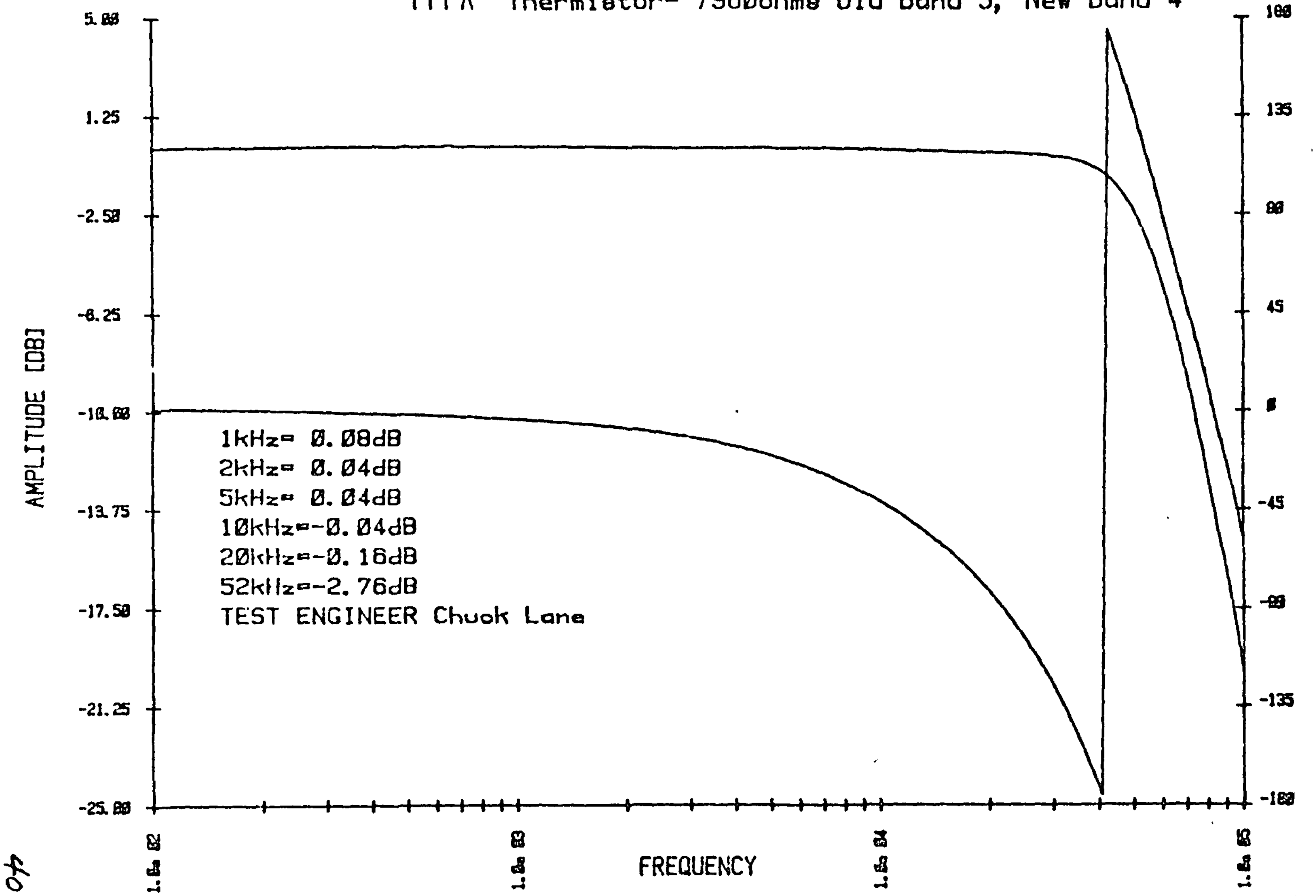
BAND 4 CHANNEL 3 09/26/81

PFPA Thermistor= 8030ohms Old Band 3, New Band 4



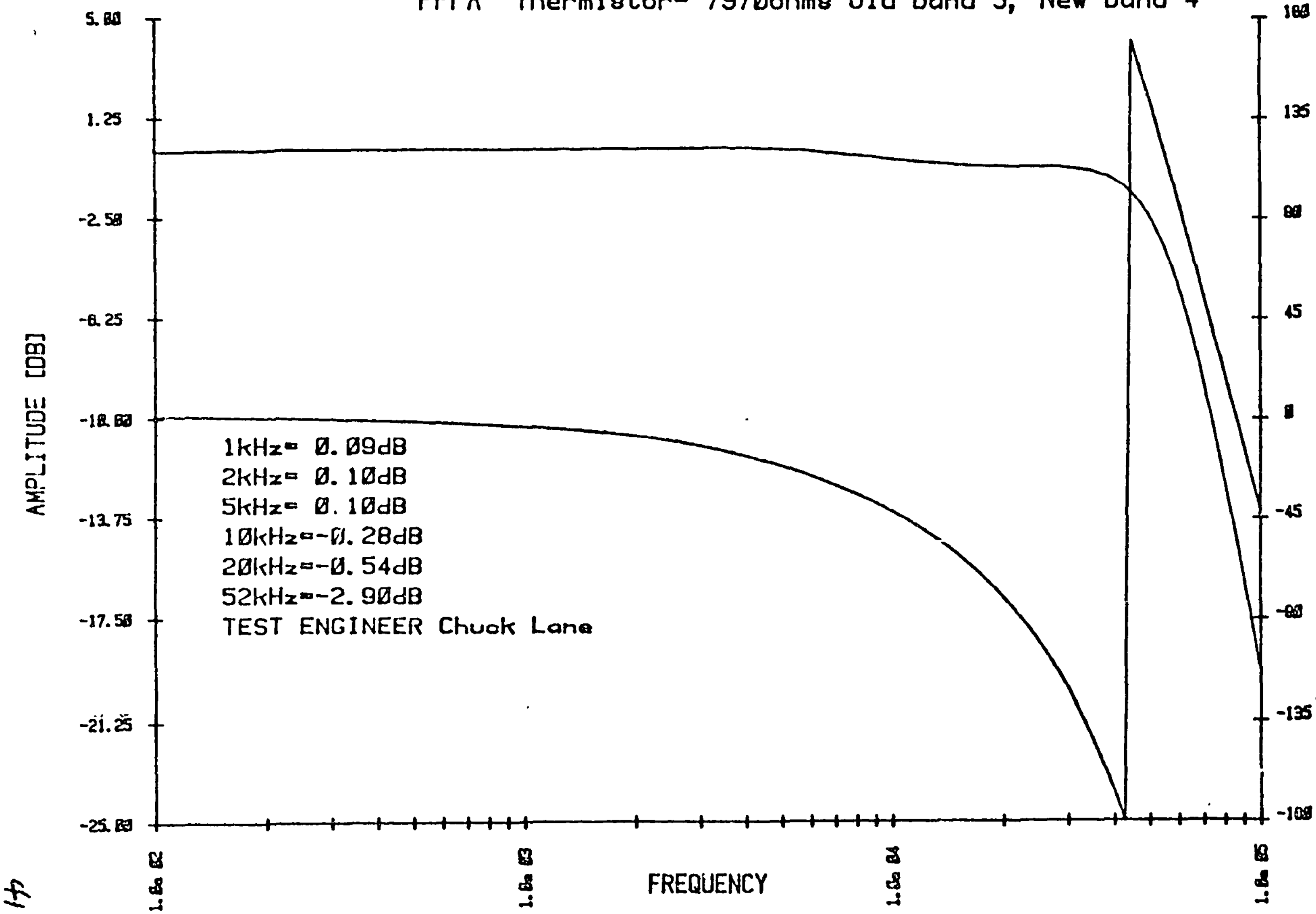
BAND 4 CHANNEL 4 09/26/81

PFPA Thermistor= 7980ohms Old Band 3, New Band 4



BAND 4 CHANNEL 5 09/26/81

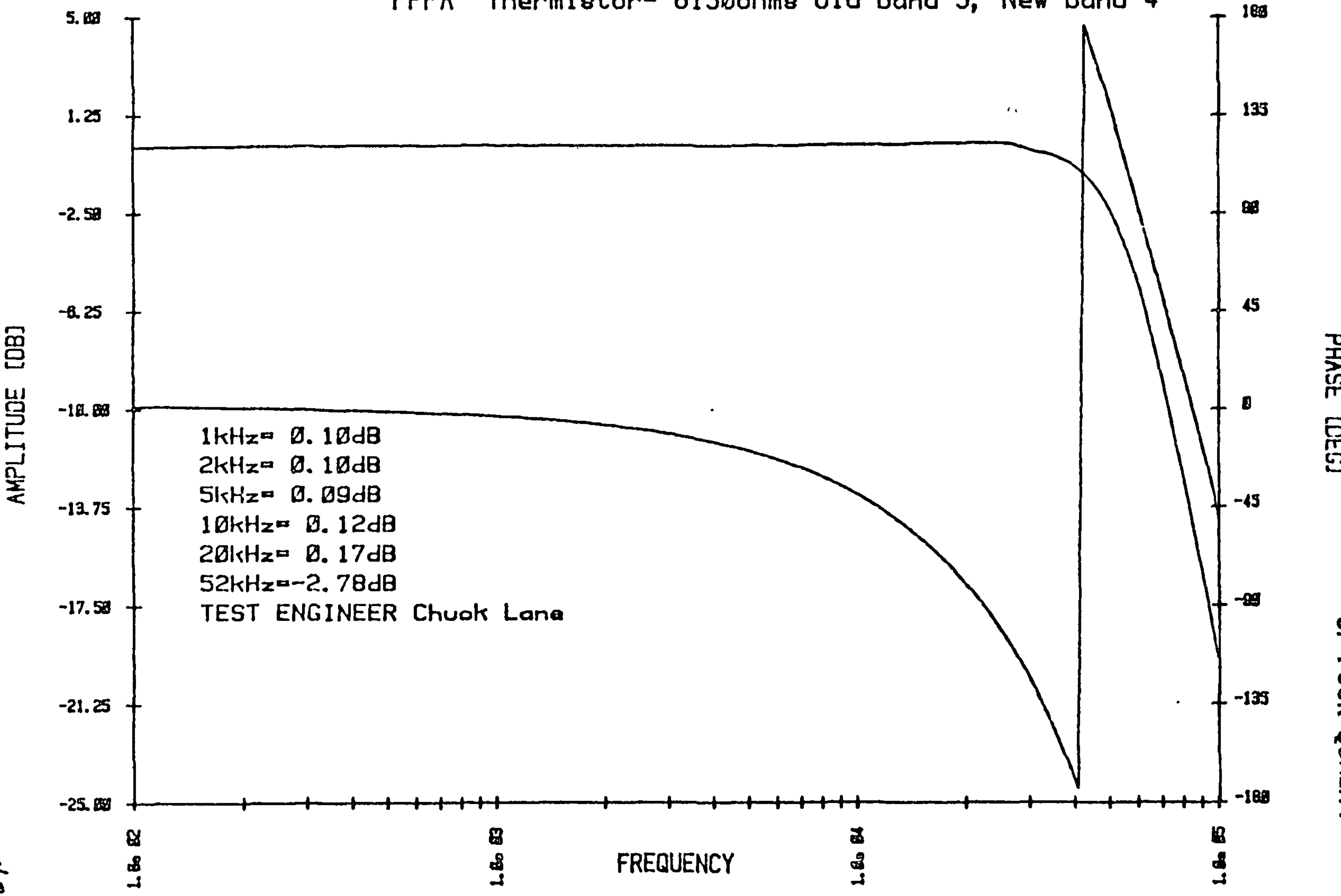
PFPA Thermistor= 7970ohms Old Band 3, New Band 4



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 6 09/26/81

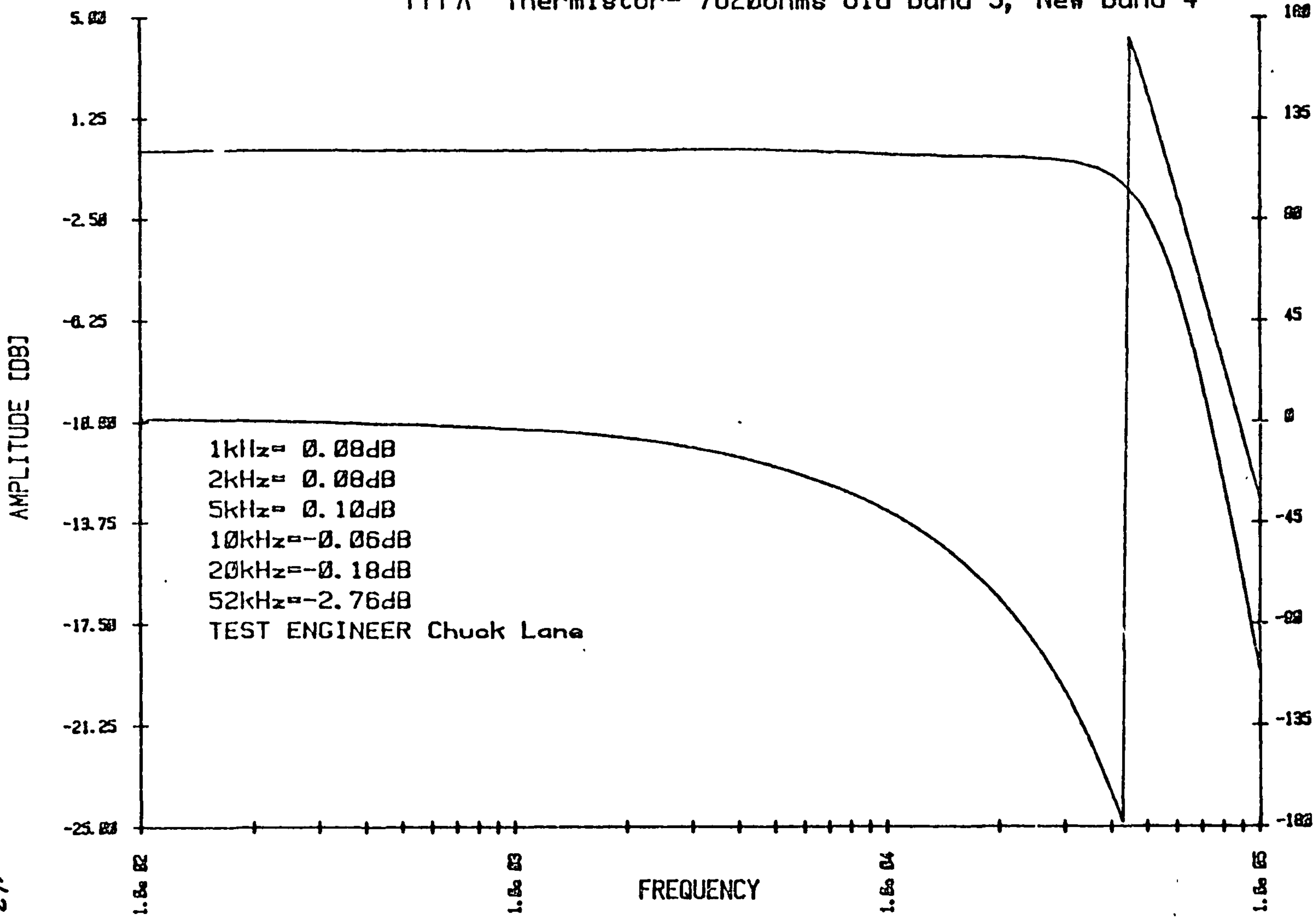
PFPA Thermistor= 8130ohms Old Band 3, New Band 4



ORIGINAL PAGE IS OF POOR QUALITY

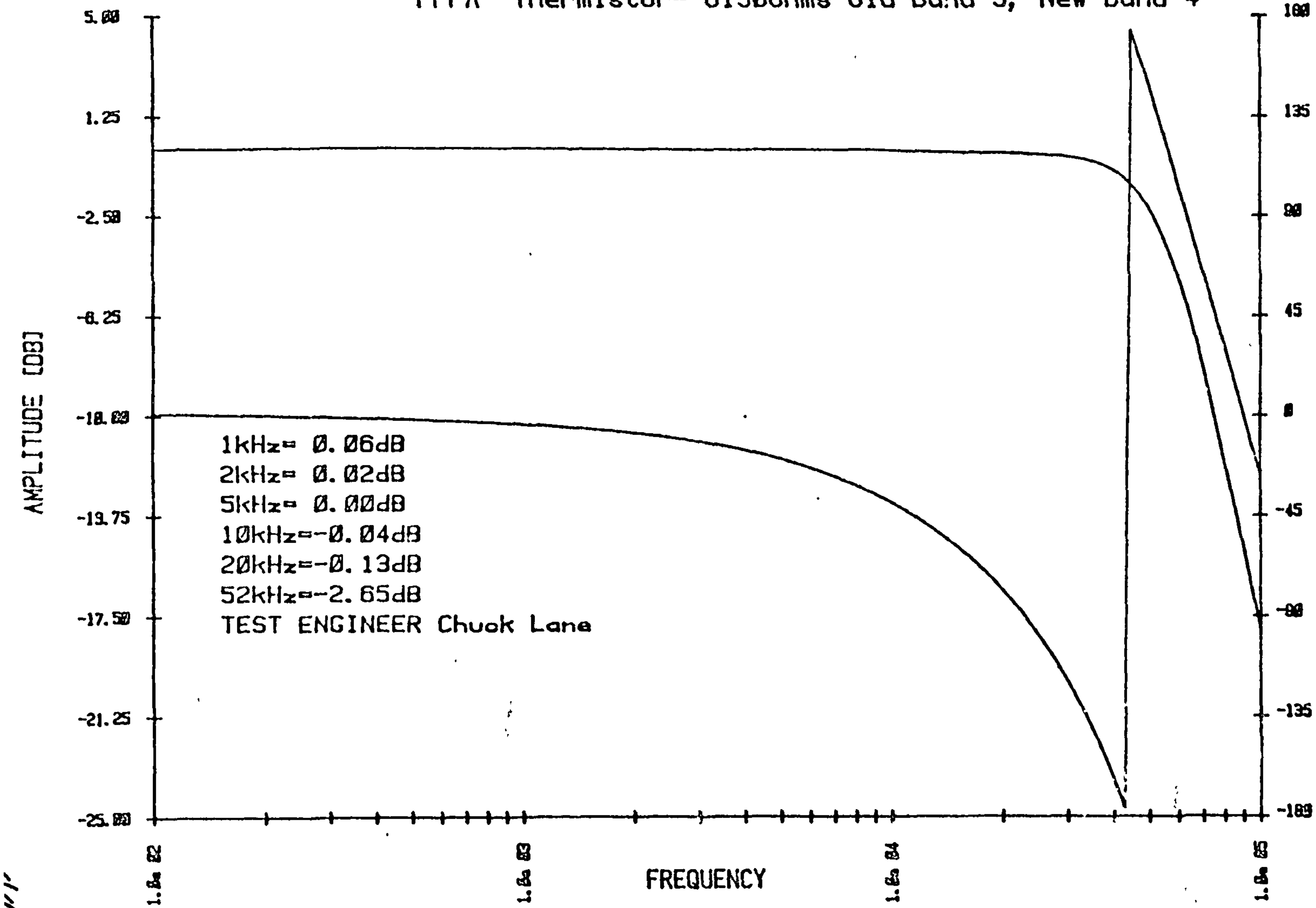
BAND 4 CHANNEL 7 09/26/81

PFPA Thermistor= 7820ohms Old Band 3, New Band 4



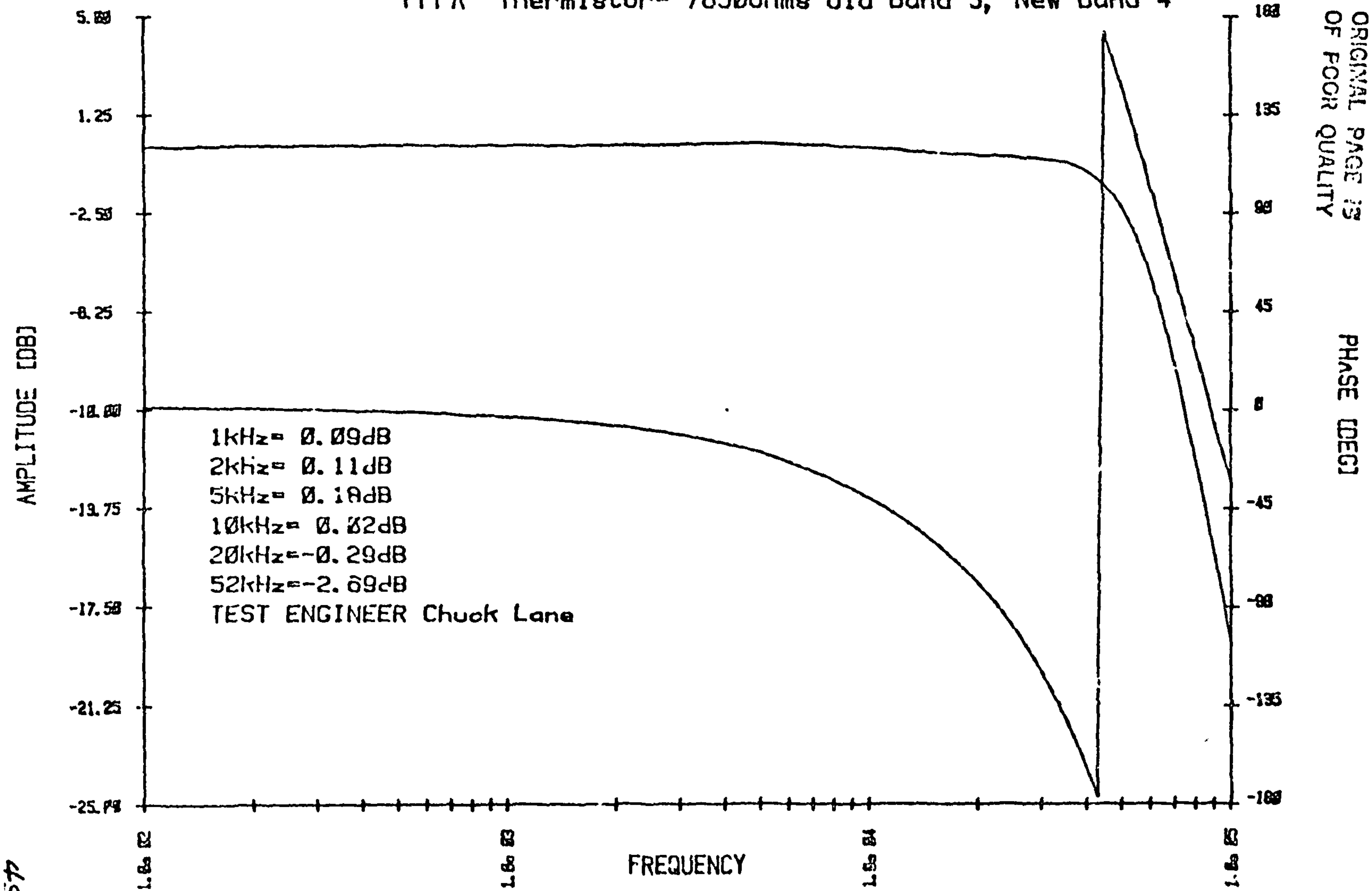
BAND 4 CHANNEL 8 Ø9/26/81

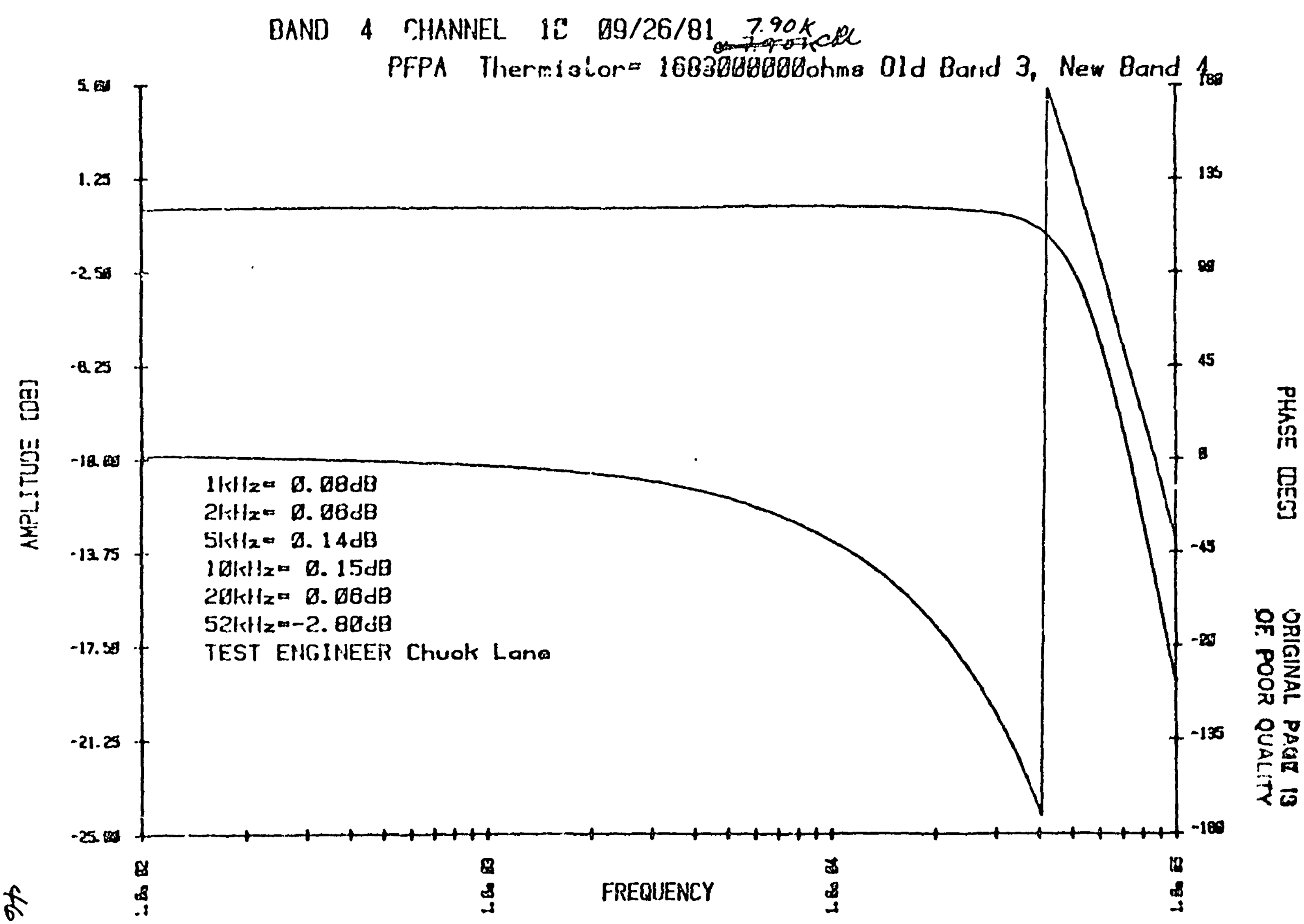
PFPA Thermistor= 813Øohms Old Band 3, New Band 4



BAND 4 CHANNEL 9 Ø9/26/81

PFPA Thermistor= 785Øohms Old Band 3, New Band 4

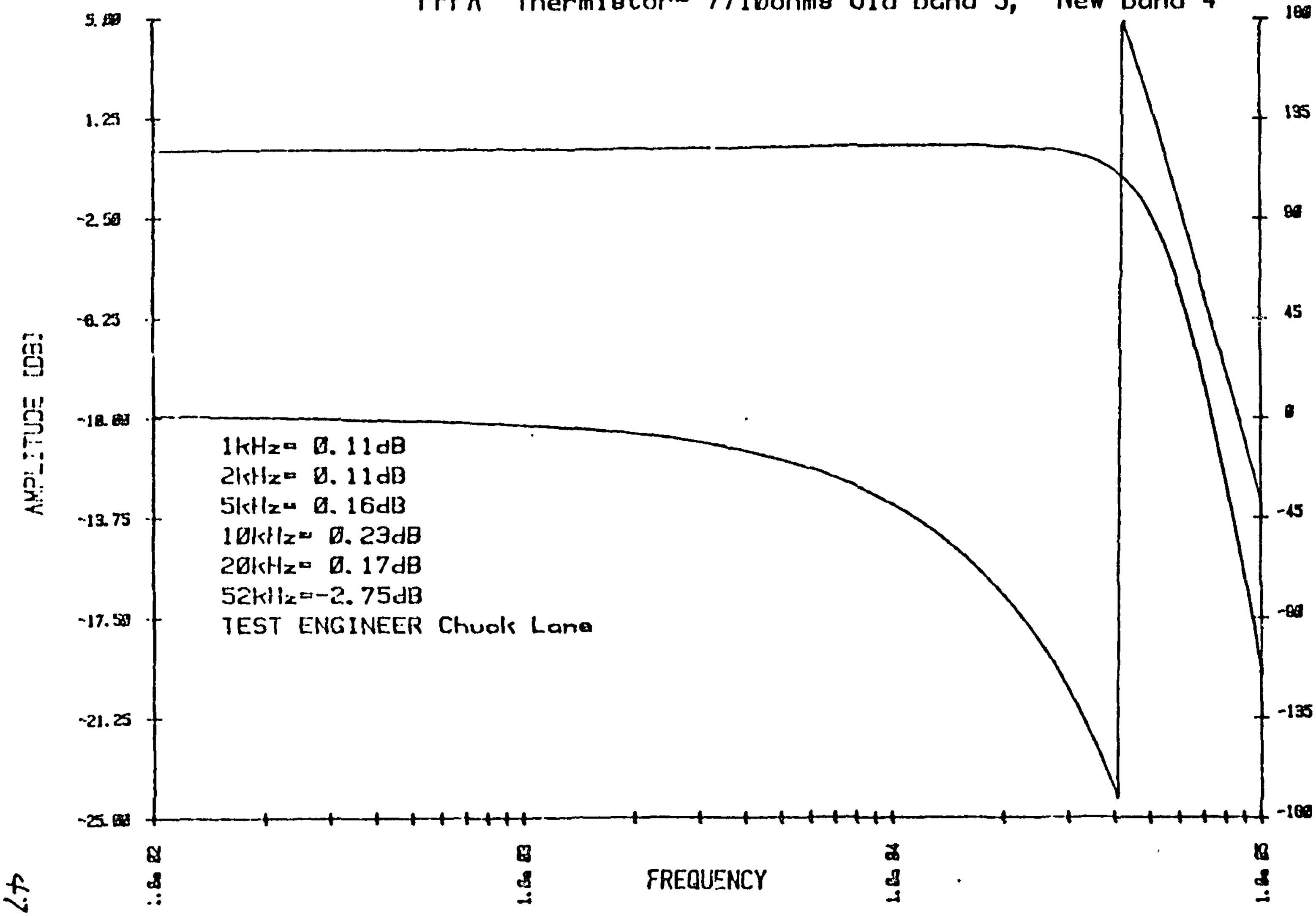




BAND 4 CHANNEL 1C 09/26/81 7.90K
PFPA Thermistor= 1683000000ohms Old Band 3, New Band 4
AMPLITUDE [DB]
PHASE [DEG]
FREQUENCY
1kHz= 0.08dB
2kHz= 0.06dB
5kHz= 0.14dB
10kHz= 0.15dB
20kHz= 0.06dB
52kHz=-2.80dB
TEST ENGINEER Chuck Lane
ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4 CHANNEL 11 09/26/81

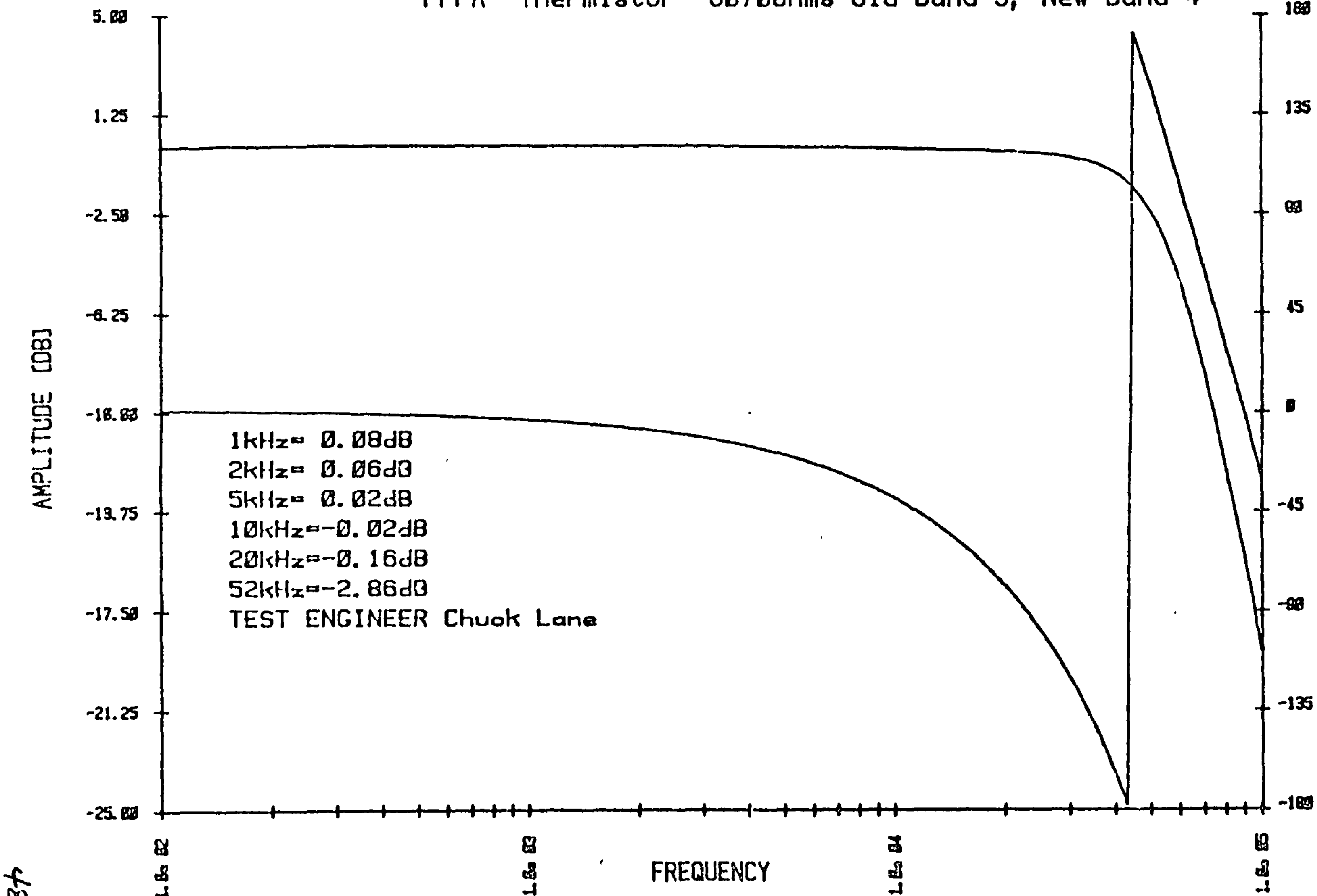
PFPA Thermistor= 7710ohms Old Band 3, New Band 4



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 12 09/26/81

PFPA Thermistor= 8070ohms Old Band 3, New Band 4

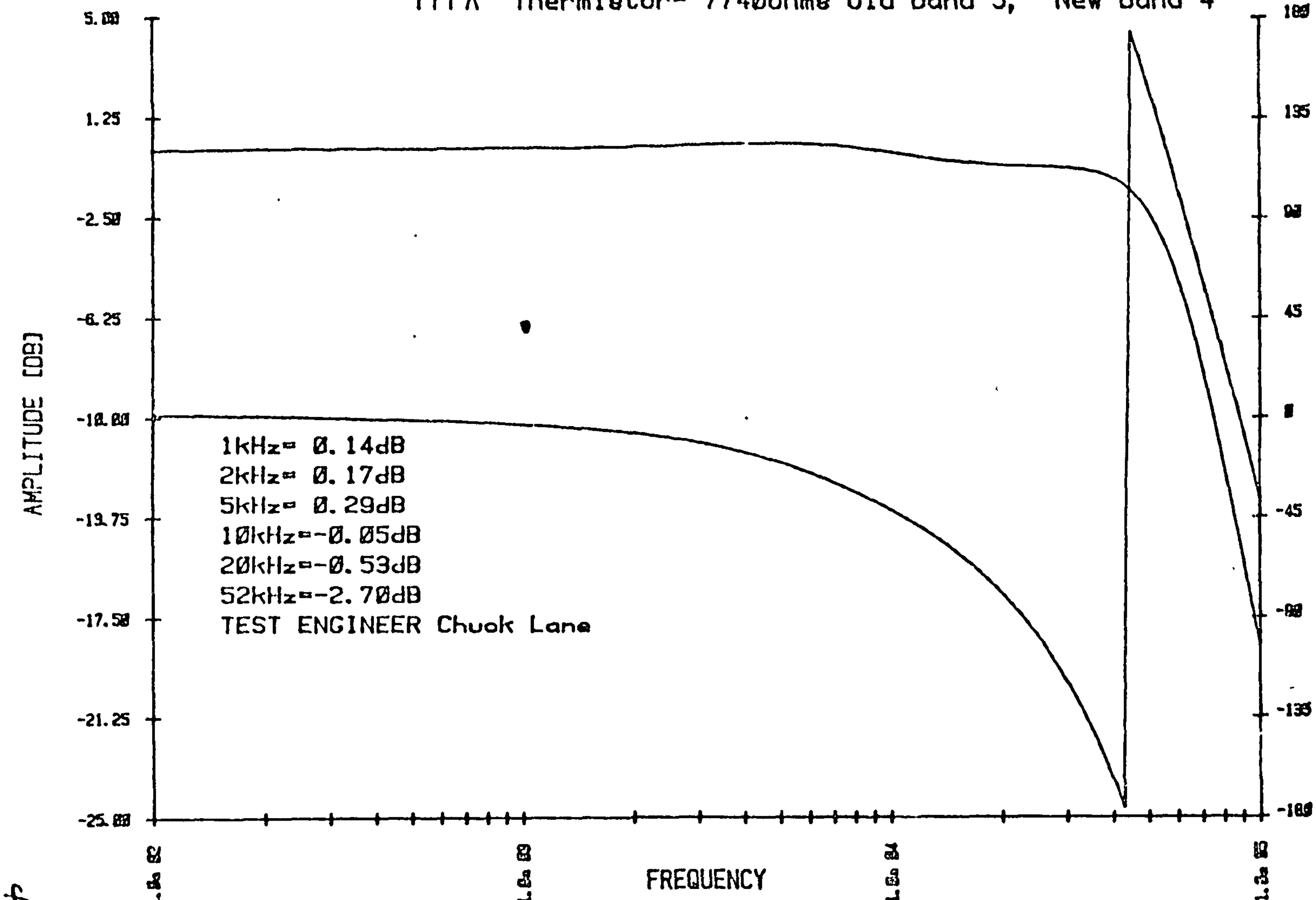


ORIGINAL PAGE IS
OF POOR QUALITY

48

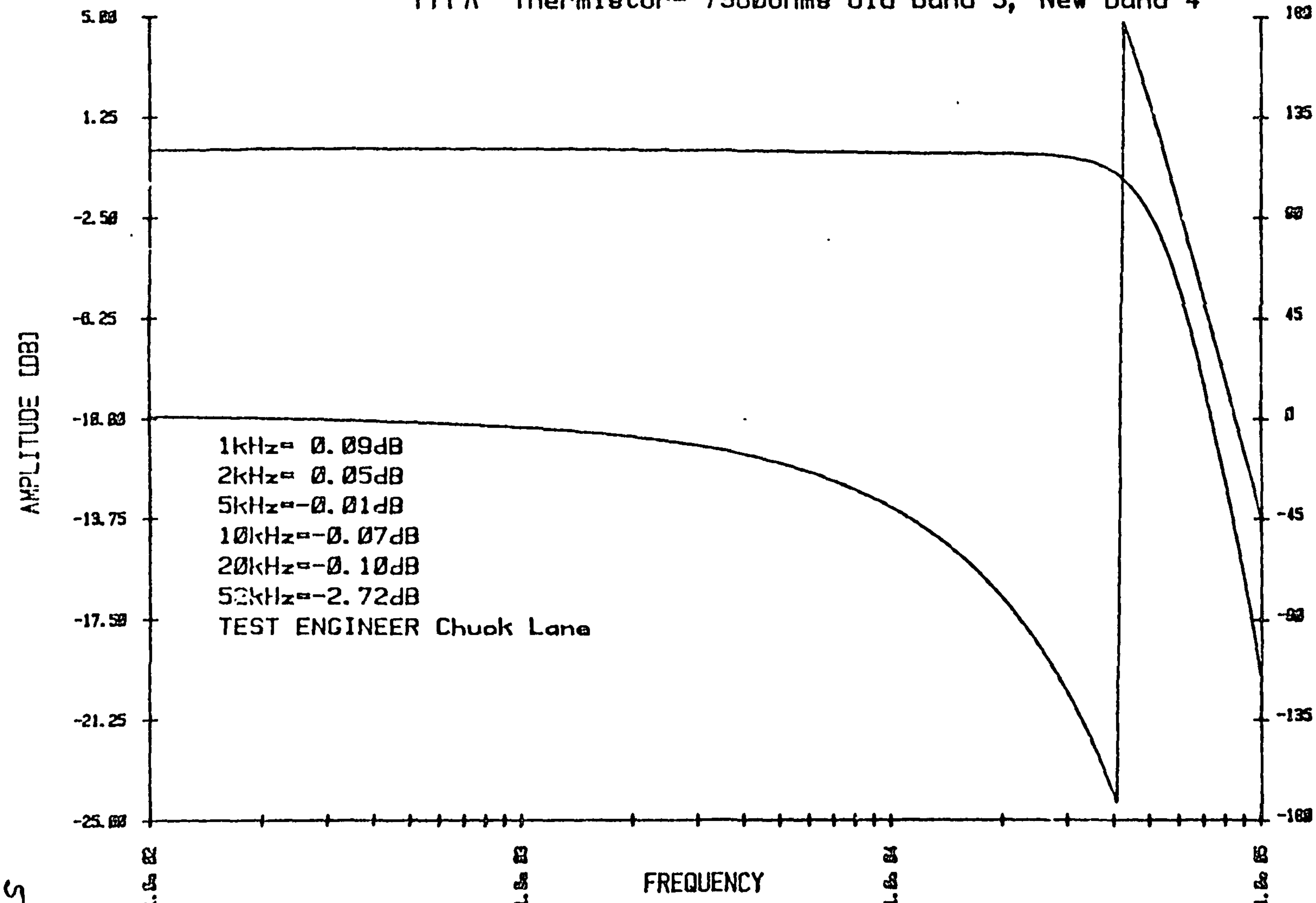
BAND 4 CHANNEL 13 09/26/81

PFPA Thermistor= 7740ohms Old Band 3, New Band 4



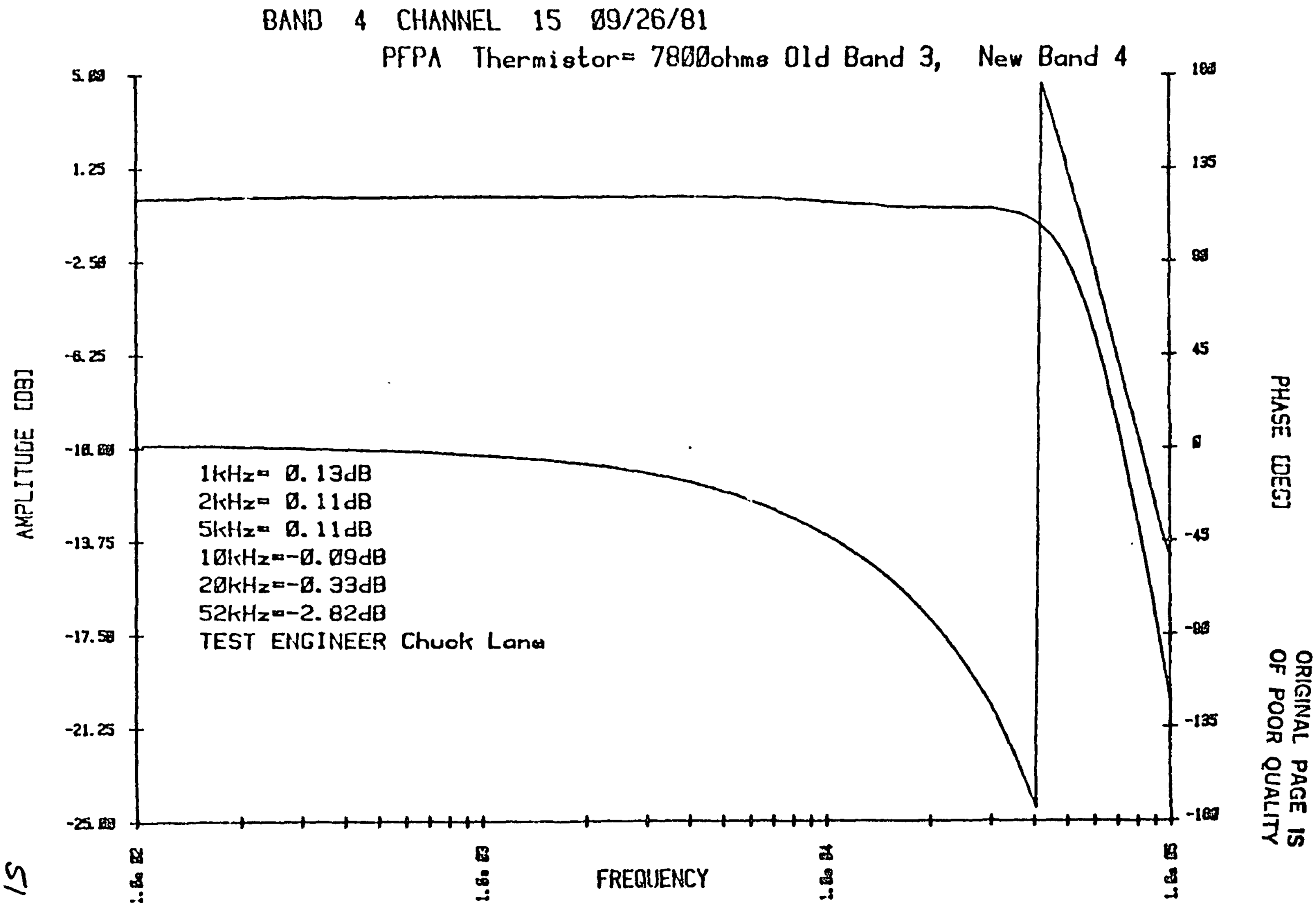
BAND 4 CHANNEL 14 09/26/81

PFPA Thermistor= 7980ohms Old Band 3, New Band 4



ORIGINAL PAGE IS OF POOR QUALITY

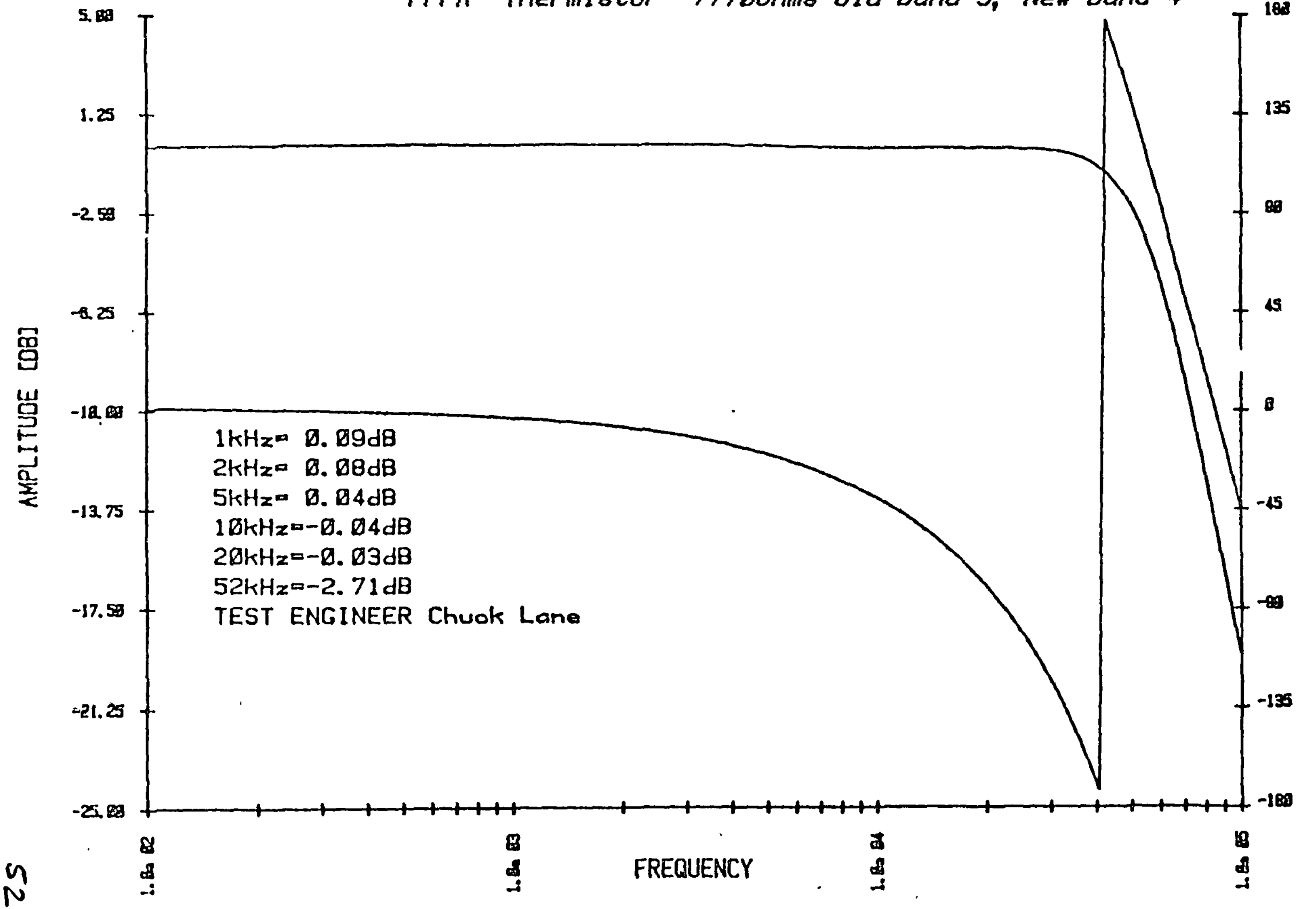
50



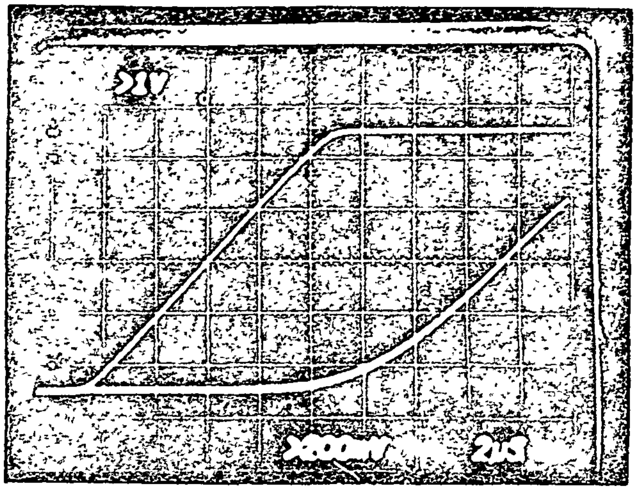
ORIGINAL PAGE IS OF POOR QUALITY

51

BAND 4 CHANNEL 16 09/26/81
PFPA Thermistor= 7770ohms Old Band 3, New Band 4



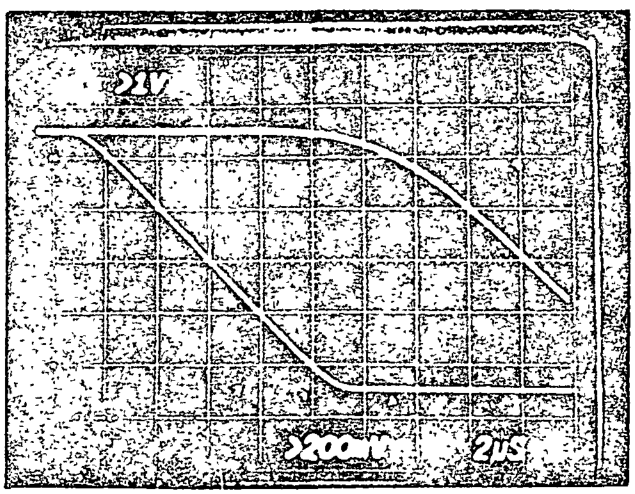
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 1

DATE: Sept. 30, 1981

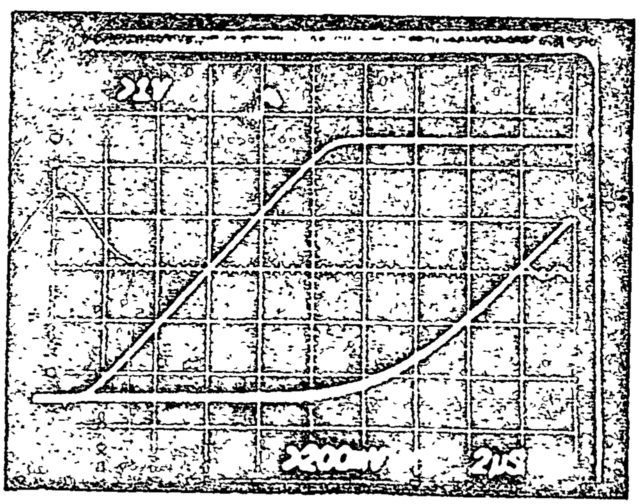
TIME: 11.4 μSec



BAND: 4
CHANNEL: 1

DATE: Sept. 30, 1981

TIME: 12.2 μSec



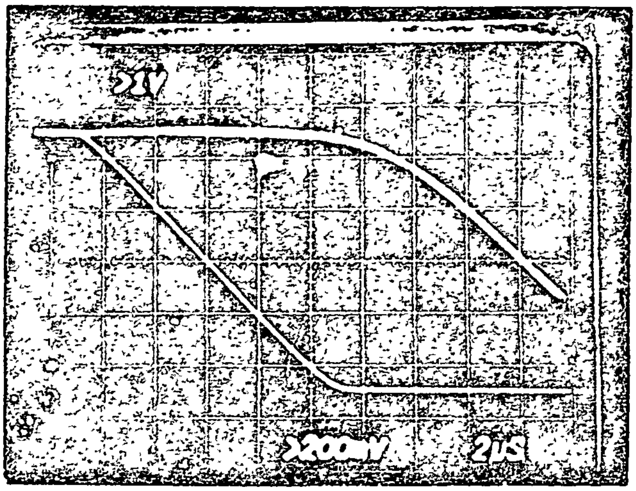
BAND: 4
CHANNEL: 2

DATE: Sept. 30, 1981

TIME: 11.8 μSec

N. C. Davison, III

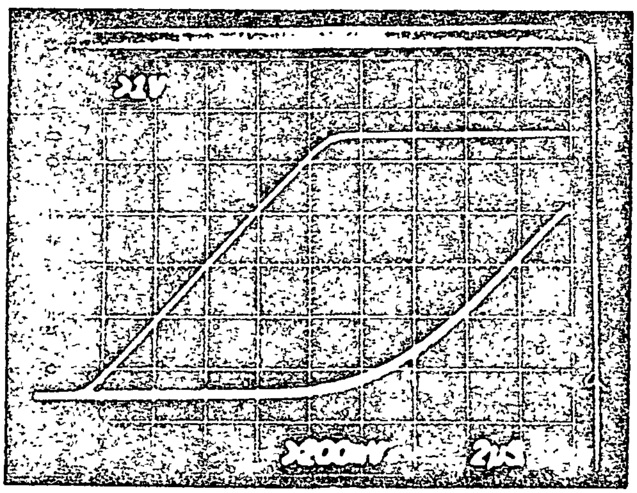
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 2

DATE: Sept. 30, 1981

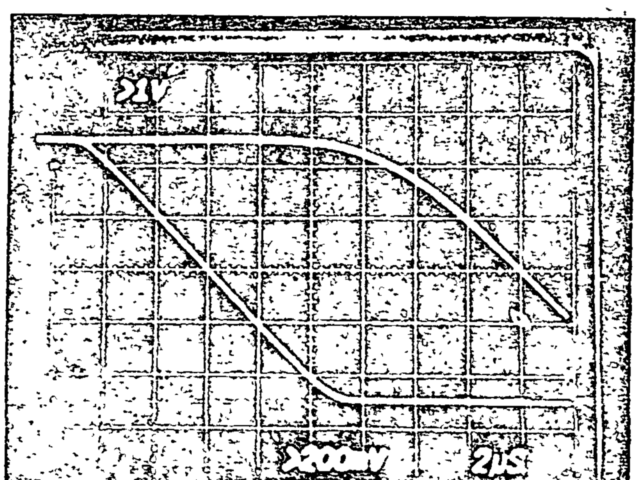
TIME: 12.0 μSec



BAND: 4
CHANNEL: 3

DATE: Sept. 30, 1981

TIME: 11.6 μSec



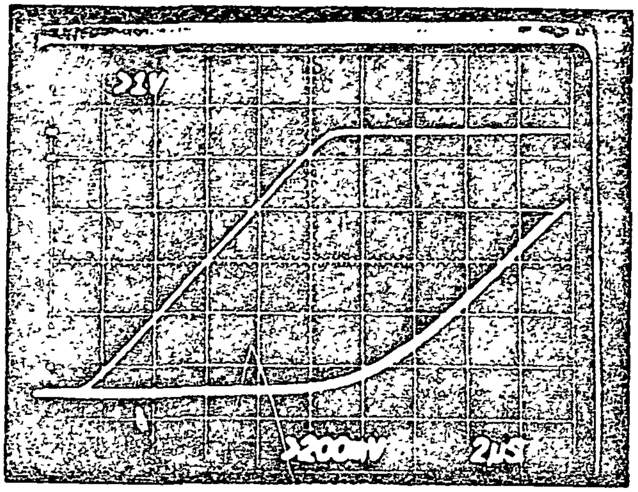
BAND: 4
CHANNEL: 3

DATE: Sept. 30, 1981

TIME: 12.0 μSec

N. C. Davison, II

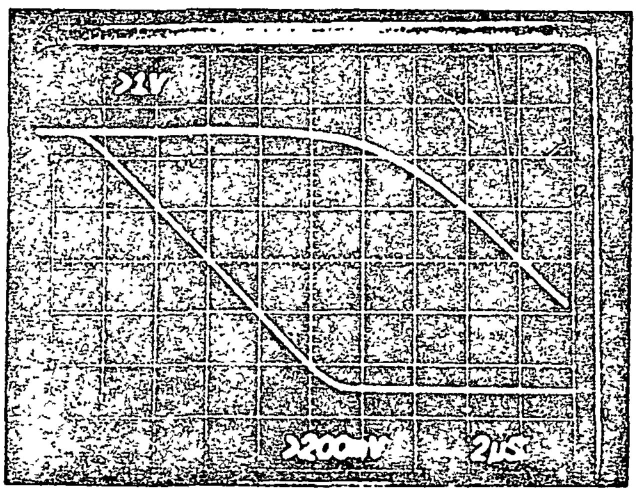
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 4

DATE: Sept. 30, 1981

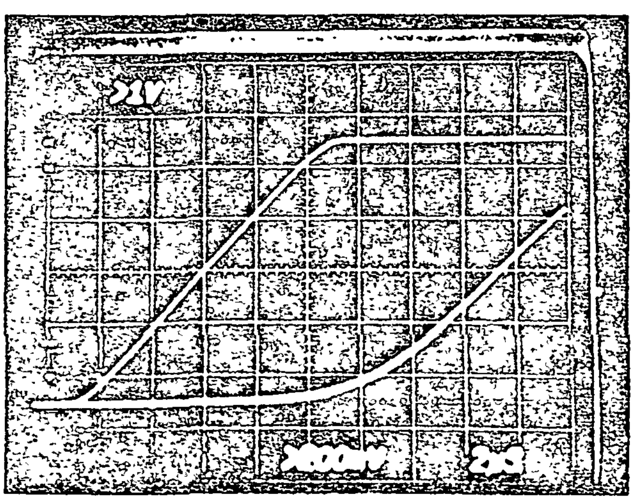
TIME: 11.4 µSec



BAND: 4
CHANNEL: 4

DATE: Sept. 30, 1981

TIME: 12.0 µSec



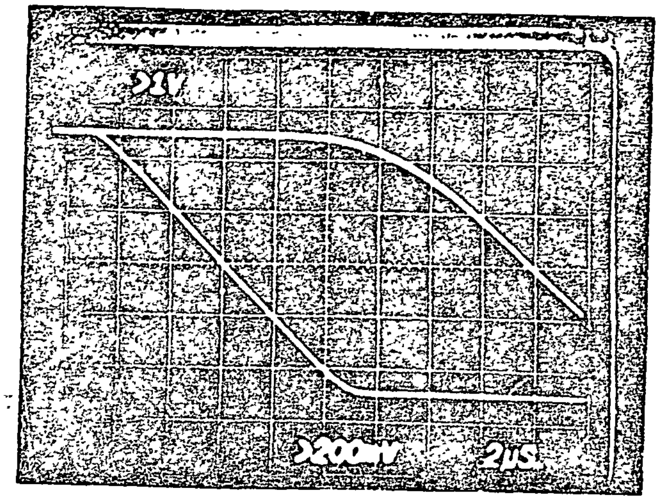
BAND: 4
CHANNEL: 5

DATE: Sept. 30, 1981

TIME: 11.4 µSec

N. C. Davison, II

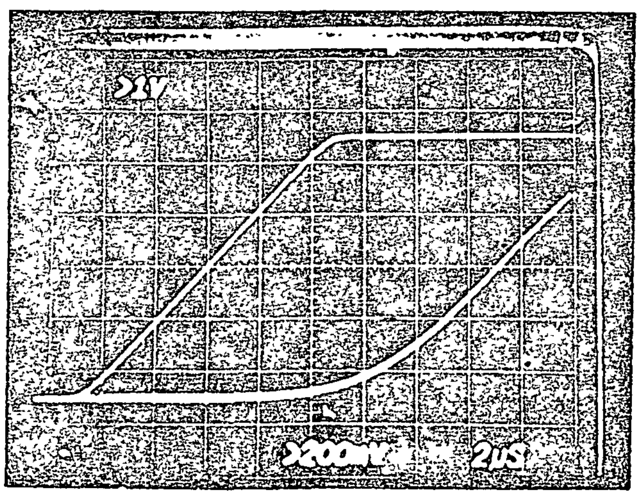
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 5

DATE: Sept. 30, 1981

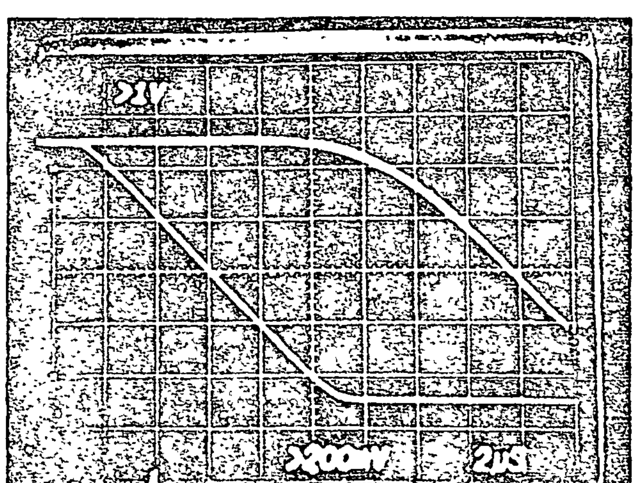
TIME: 11.8 μSec



BAND: 4
CHANNEL: 6

DATE: Sept. 30, 1981

TIME: 11.2 μSec



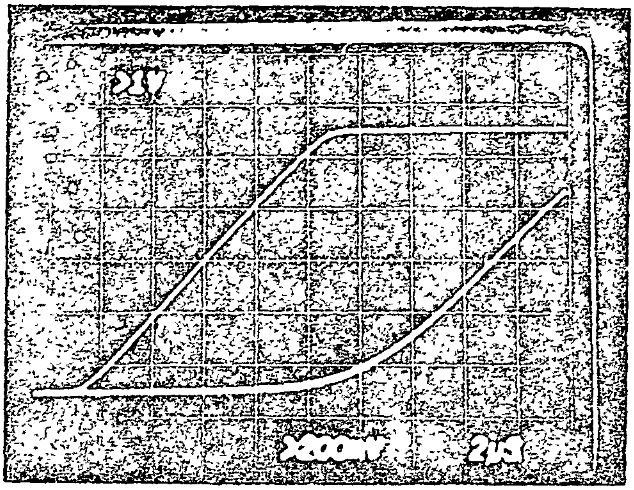
BAND: 4
CHANNEL: 6

DATE: Sept. 30, 1981

TIME: 11.6 μSec

N. C. DAVISON, III

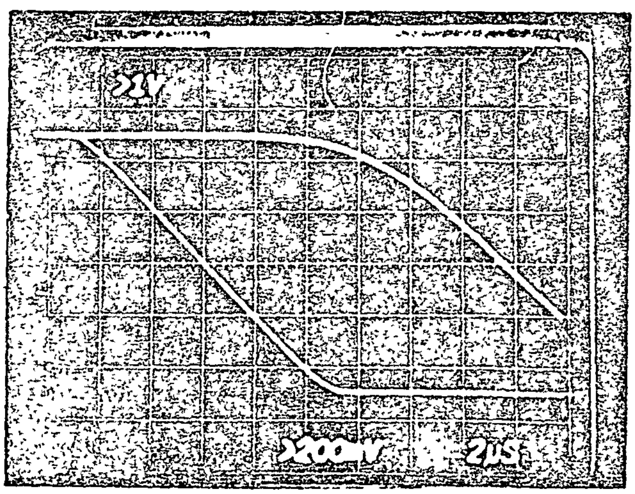
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 7

DATE: Sept. 30, 1981

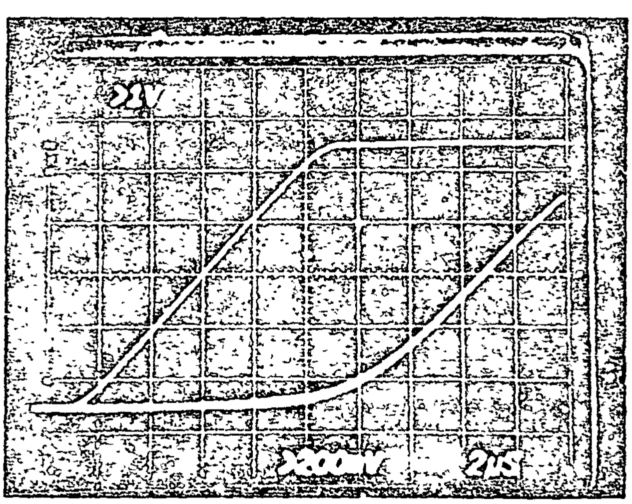
TIME: 11.2 μSec



BAND: 4
CHANNEL: 7

DATE: Sept. 30, 1981

TIME: 11.6 μSec

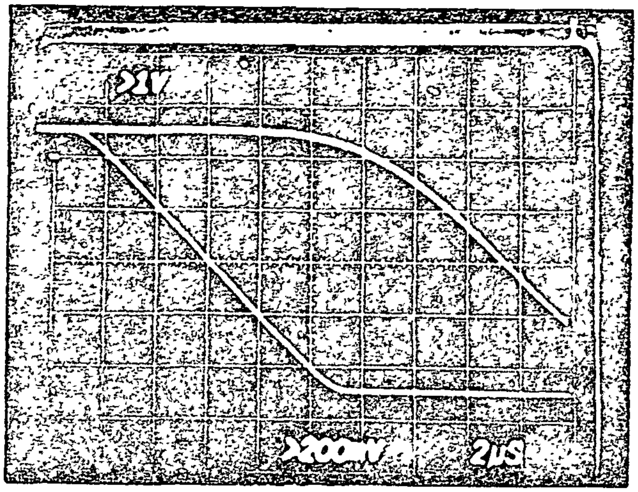


BAND: 4
CHANNEL: 8

DATE: Sept. 30, 1981

TIME: 10.8 μSec

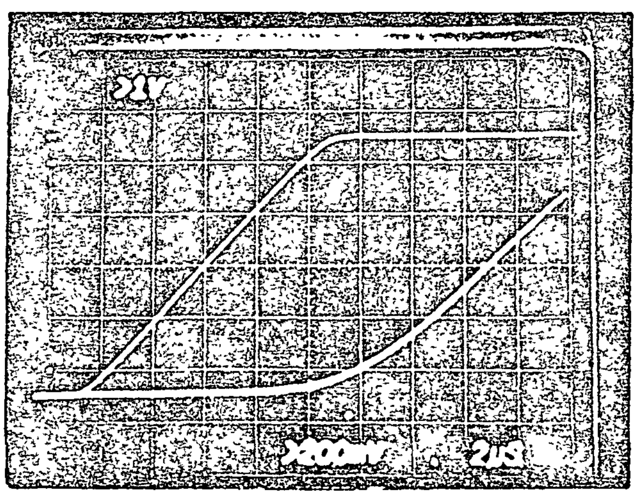
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 8

DATE: Sept. 30, 1981

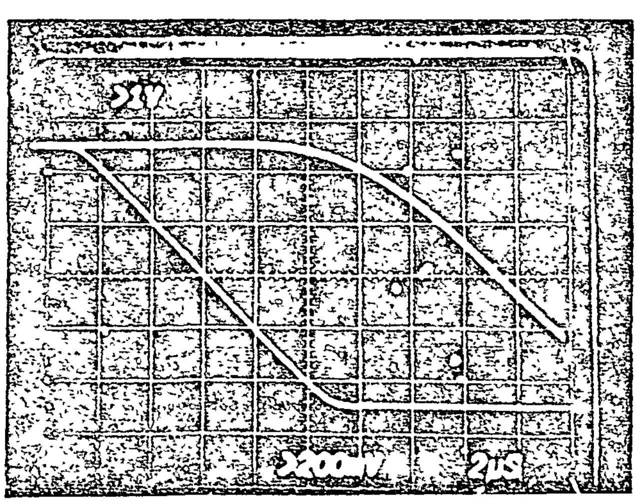
TIME: 11.4 µSec



BAND: 4
CHANNEL: 9

DATE: Sept. 30, 1981

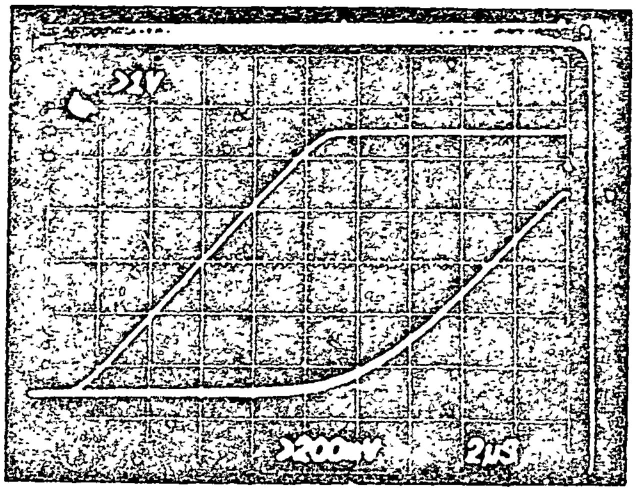
TIME: 10.8 µSec



BAND: 4
CHANNEL: 9

DATE: Sept. 30, 1981

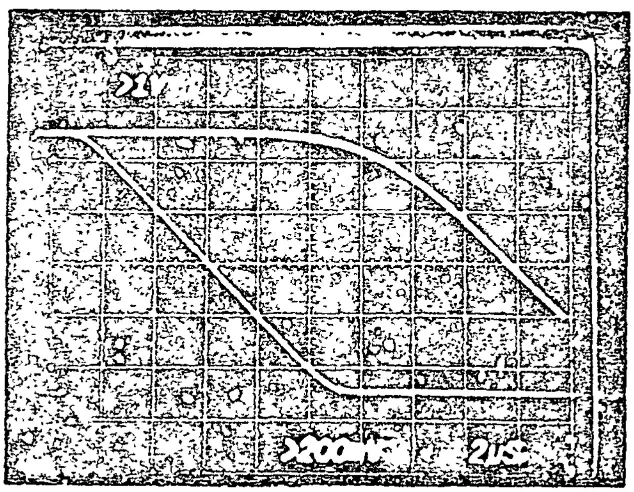
TIME: 11.4 µSec



BAND: 4
CHANNEL: 10

DATE: Sept. 30, 1981

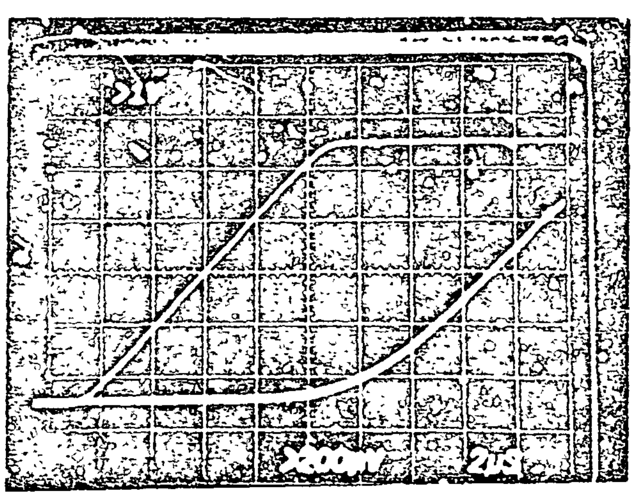
TIME: 11.2 μSec



BAND: 4
CHANNEL: 10

DATE: Sept. 30, 1981

TIME: 11.6 μSec

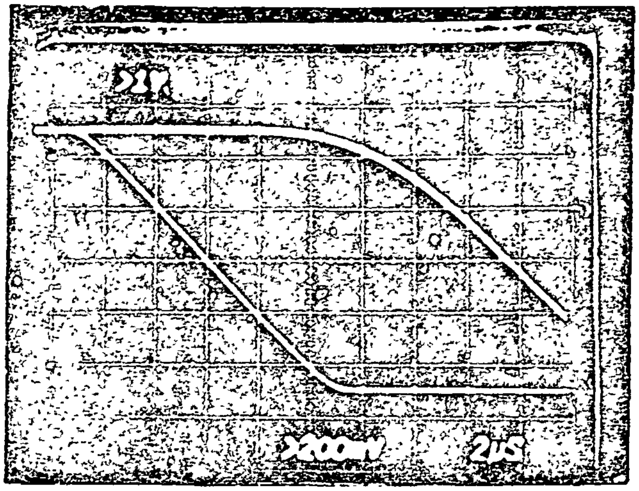


BAND: 4
CHANNEL: 11

DATE: Sept. 30, 1981

TIME: 11.0 μSec

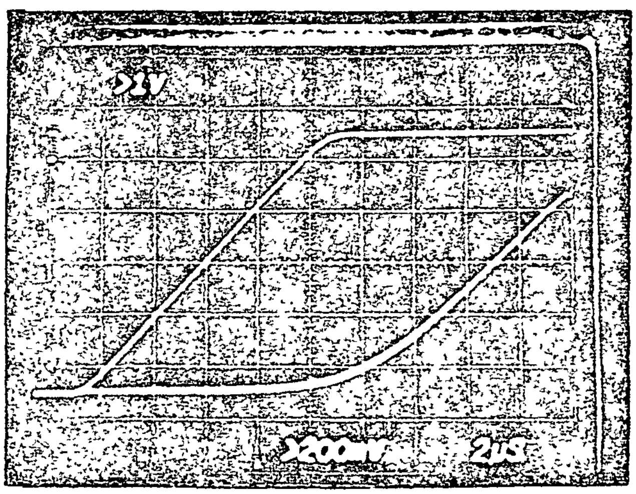
ORIGINAL PAGE IS
OF POOR QUALITY



BAND: 4
CHANNEL: 11

DATE: Sept. 30, 1981

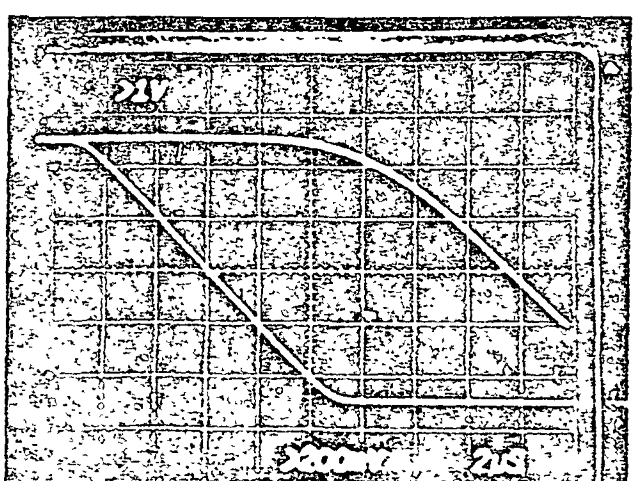
TIME: 11.6 μSec



BAND: 4
CHANNEL: 12

DATE: Sept. 30, 1981

TIME: 11.0 μSec

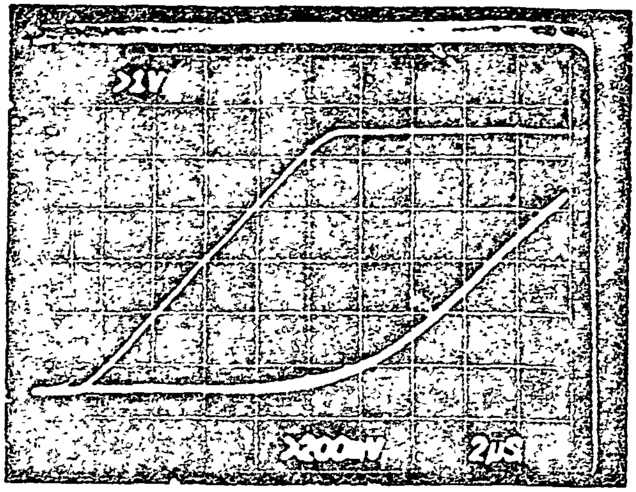


BAND: 4
CHANNEL: 12

DATE: Sept. 30, 1981

TIME: 11.6 μSec

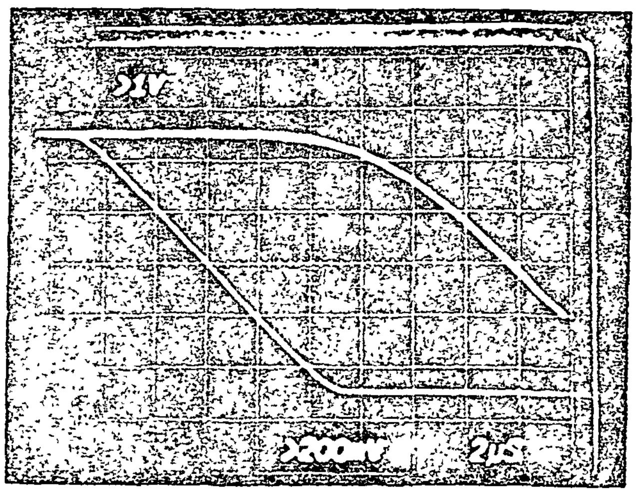
N. C. Davison, II



BAND: 4
CHANNEL: 13

DATE: Sept. 30, 1981

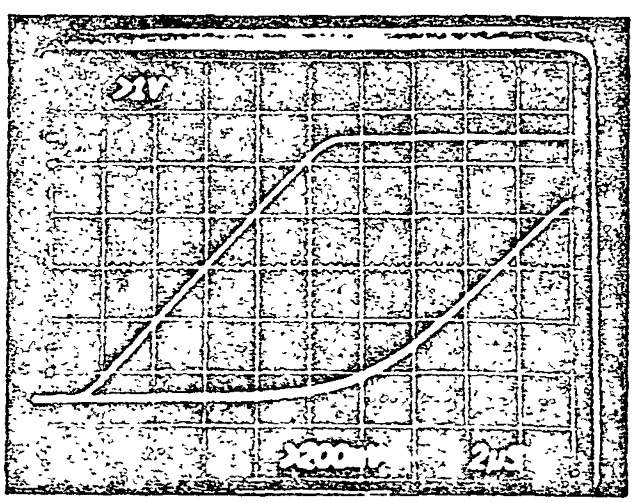
TIME: 11.2 μSec



BAND: 4
CHANNEL: 13

DATE: Sept. 30, 1981

TIME: 11.6 μSec

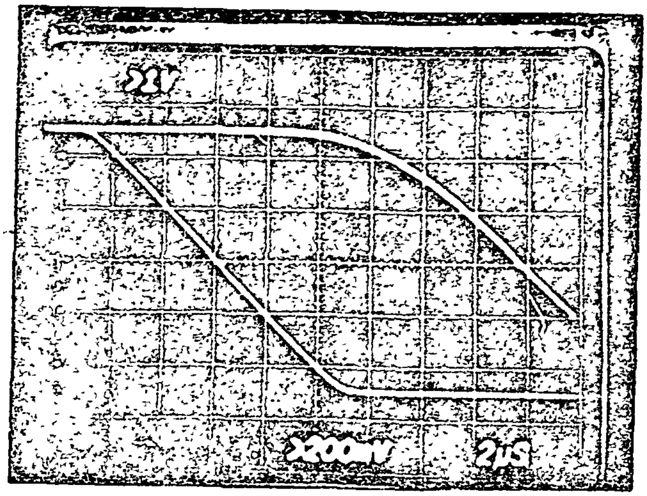


BAND: 4
CHANNEL: 14

DATE: Sept. 30, 1981

TIME: 11.2 μSec

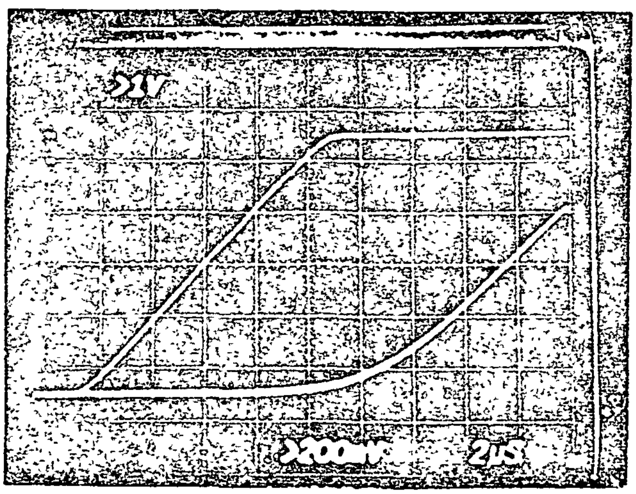
N. C. Davison, III



BAND: 4
CHANNEL: 14

DATE: Sept. 30, 1981

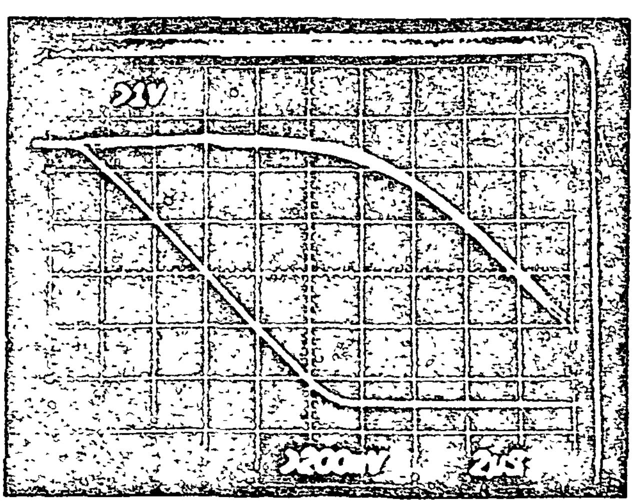
TIME: 11.8 μSec



BAND: 4
CHANNEL: 15

DATE: Sept. 30, 1981

TIME: 11.6 μSec

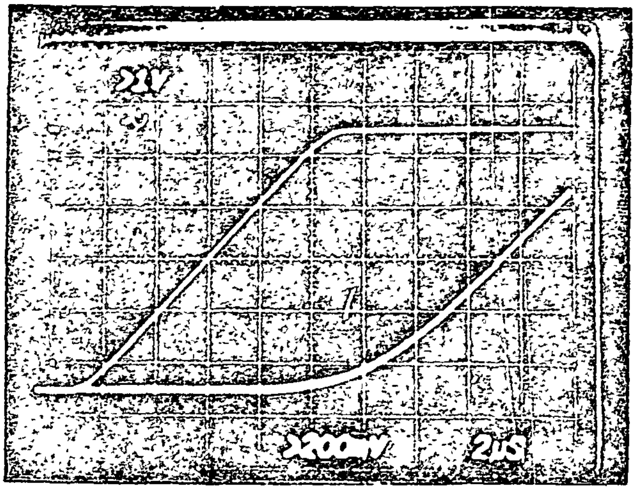


BAND: 4
CHANNEL: 15

DATE: Sept. 30, 1981

TIME: 12.0 μSec

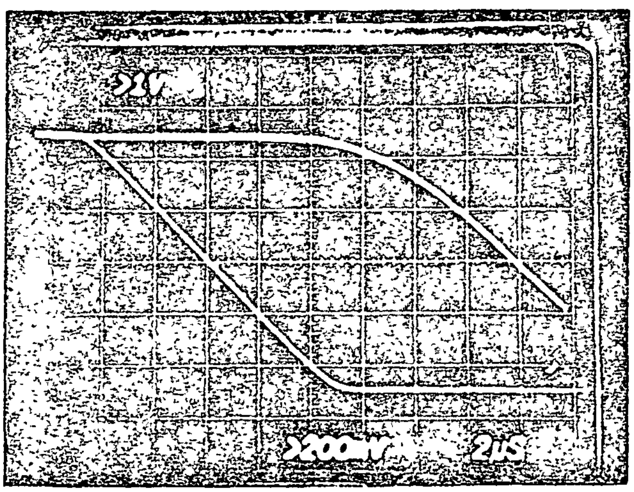
N. C. Davison, =



BAND: 4
CHANNEL: 16

DATE: Sept. 30, 1981

TIME: 11.2 μSec



BAND: 4
CHANNEL: 16

DATE: Sept. 30, 1981

TIME: 11.8 μSec

BAND:
CHANNEL:

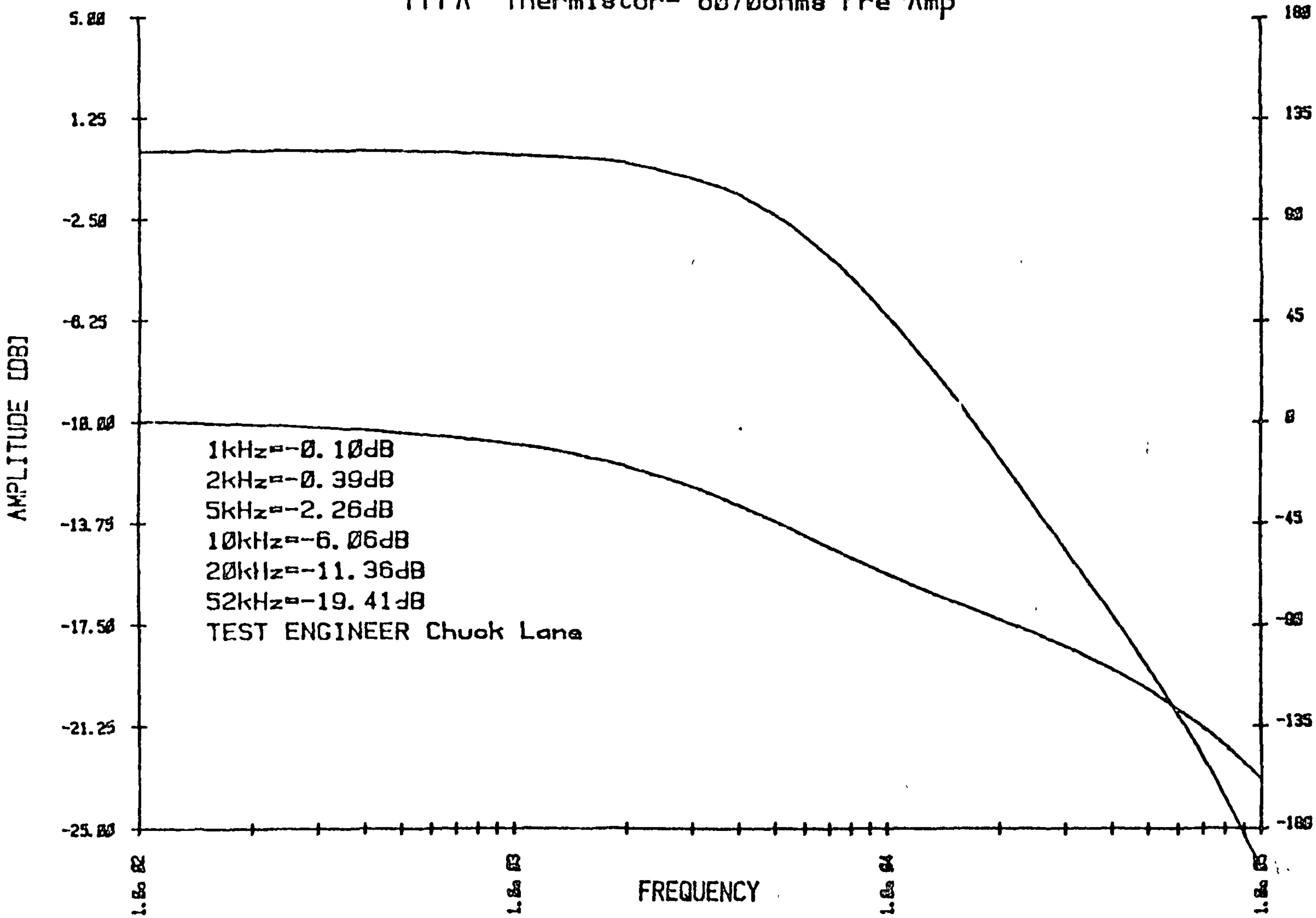
DATE:

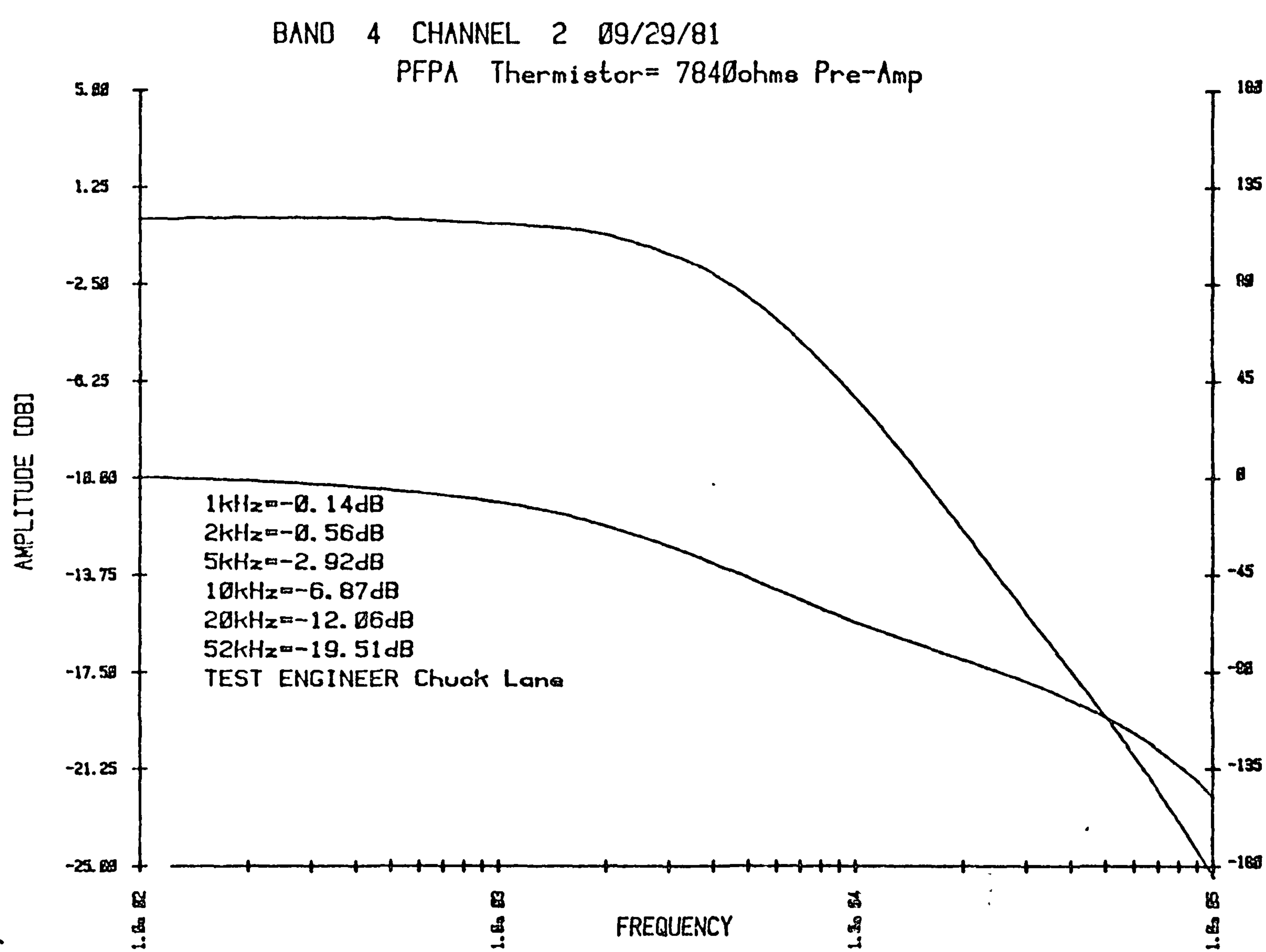
TIME:

N. C. Davison, II

BAND 4 CHANNEL 1 09/29/81

PFPA Thermistor= 8070ohms Pre-Amp

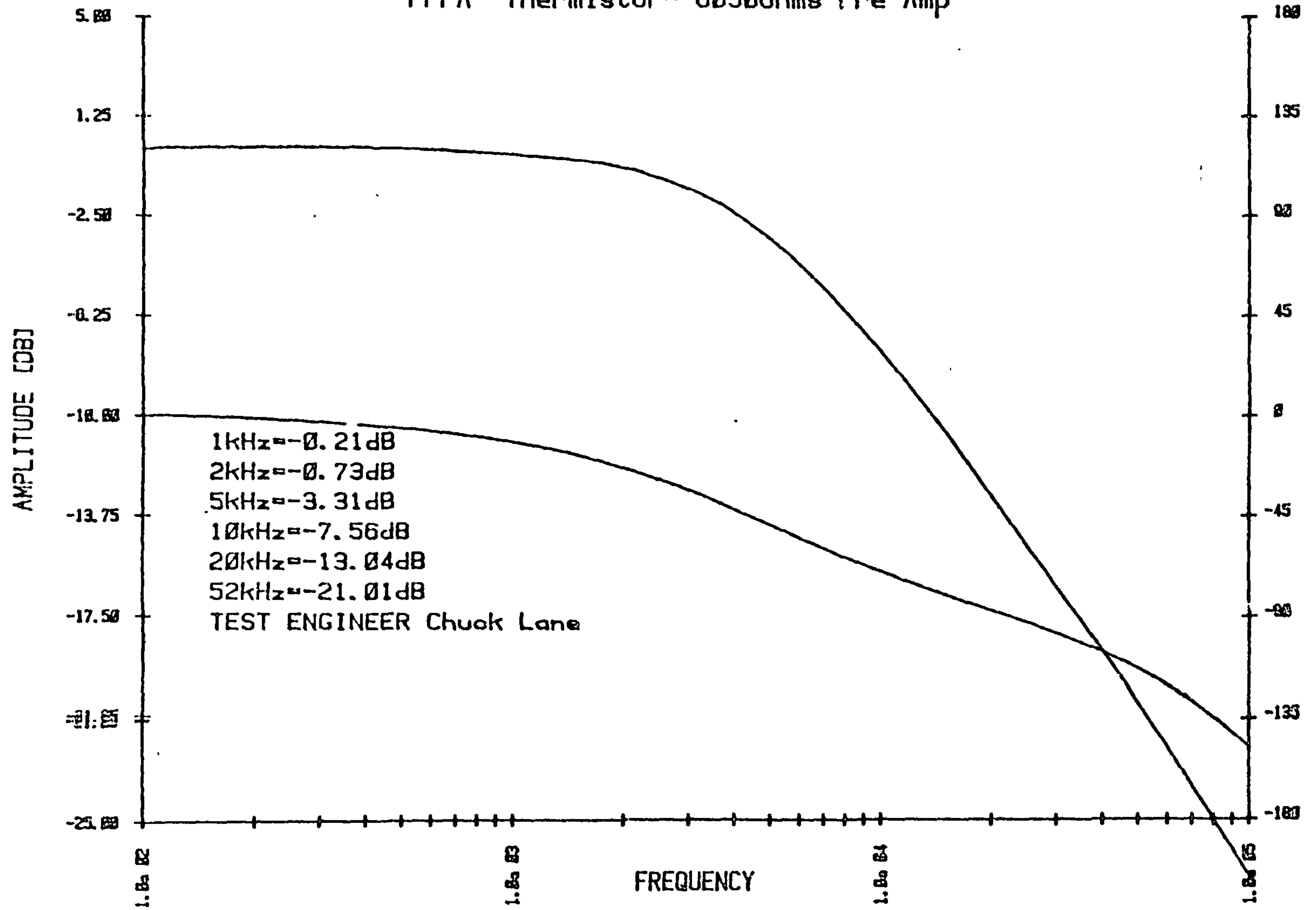




ORIGINAL PAGE IS
OF POOR QUALITY

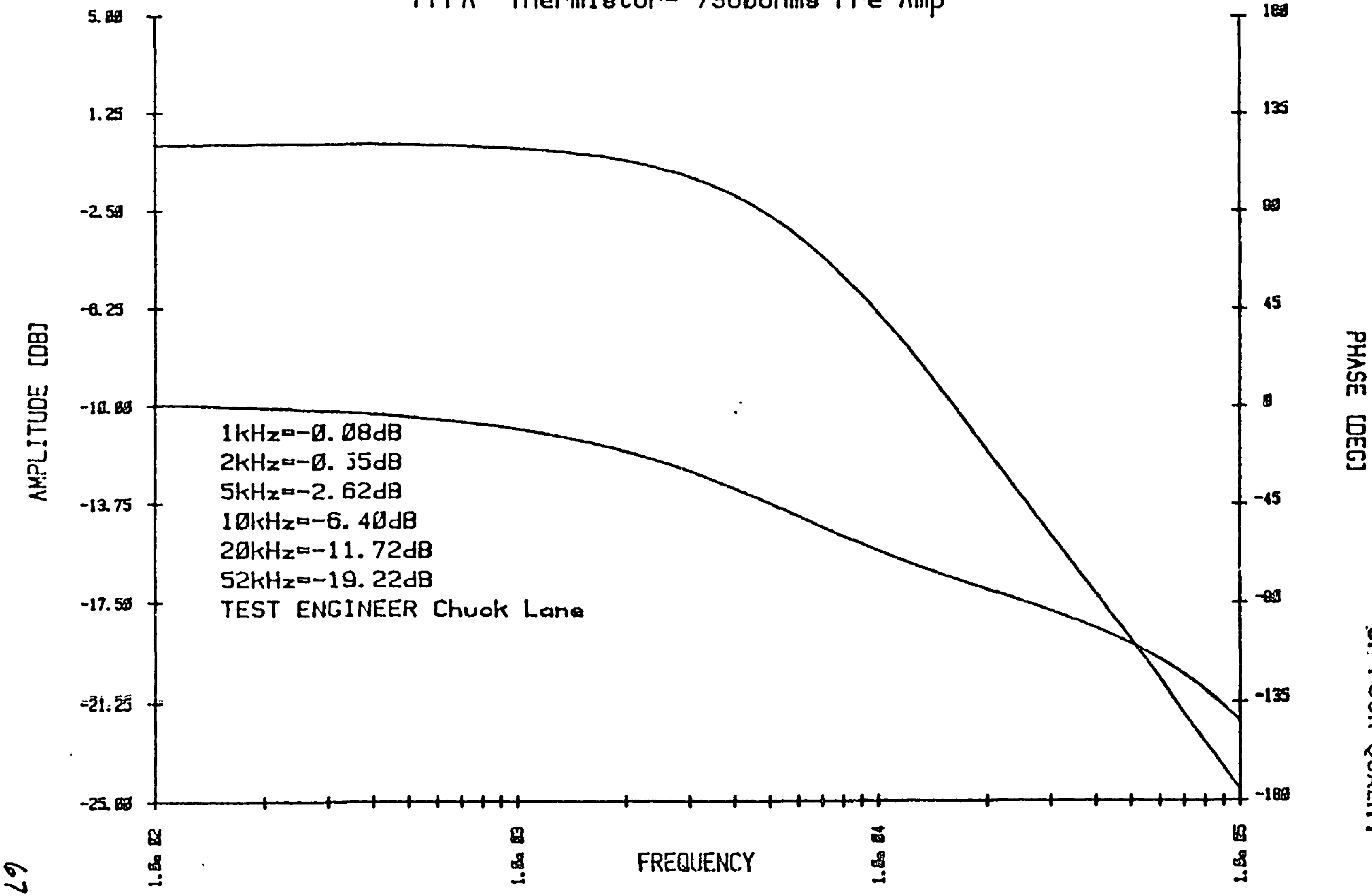
BAND 4 CHANNEL 3 Ø9/29/81

PFPA Thermistor= 8Ø5Øohms Pre-Amp



BAND 4 CHANNEL 4 09/29/81

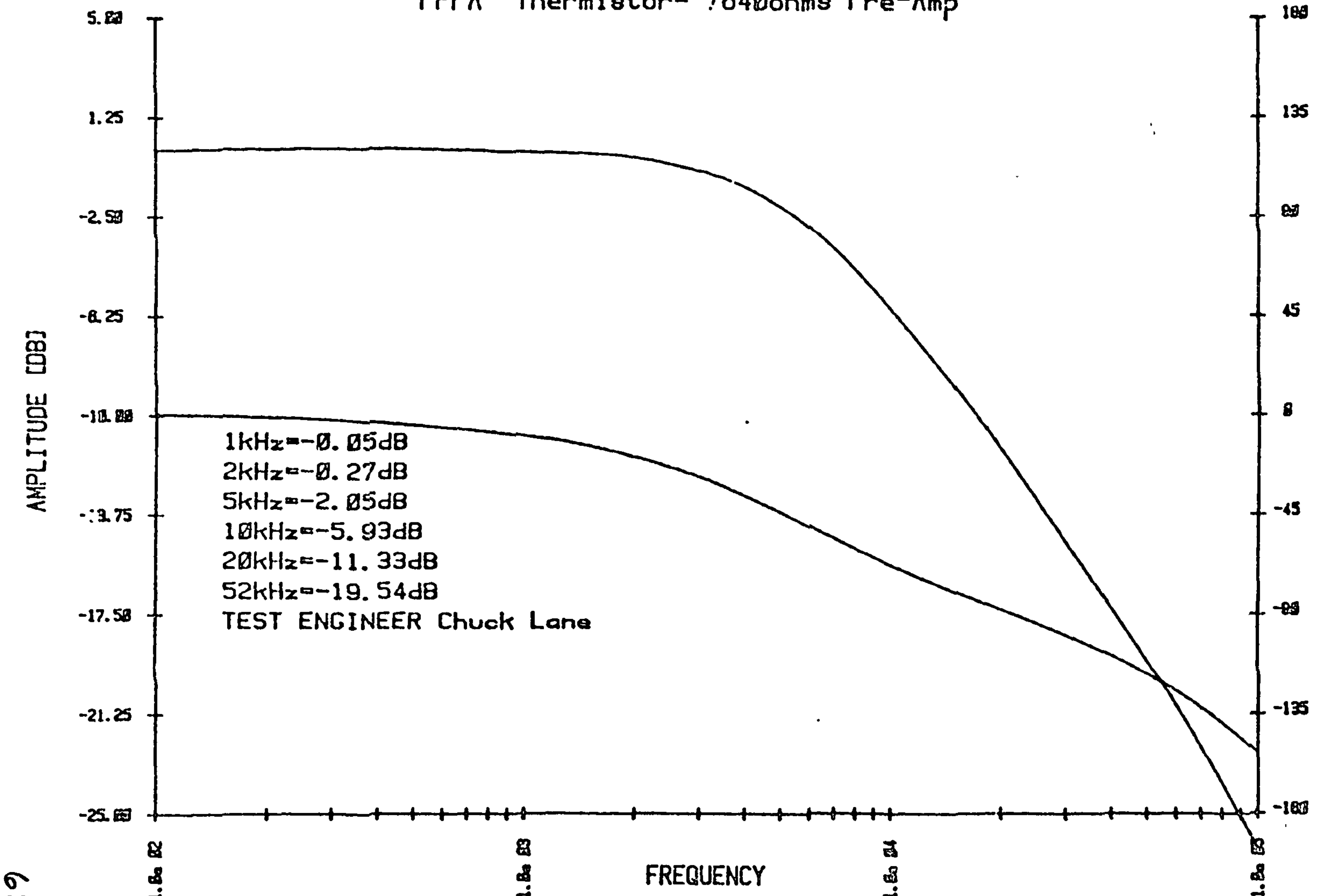
PFPA Thermistor= 7960ohms Pre-Amp



ORIGINAL PAGE IS
OF POOR QUALITY

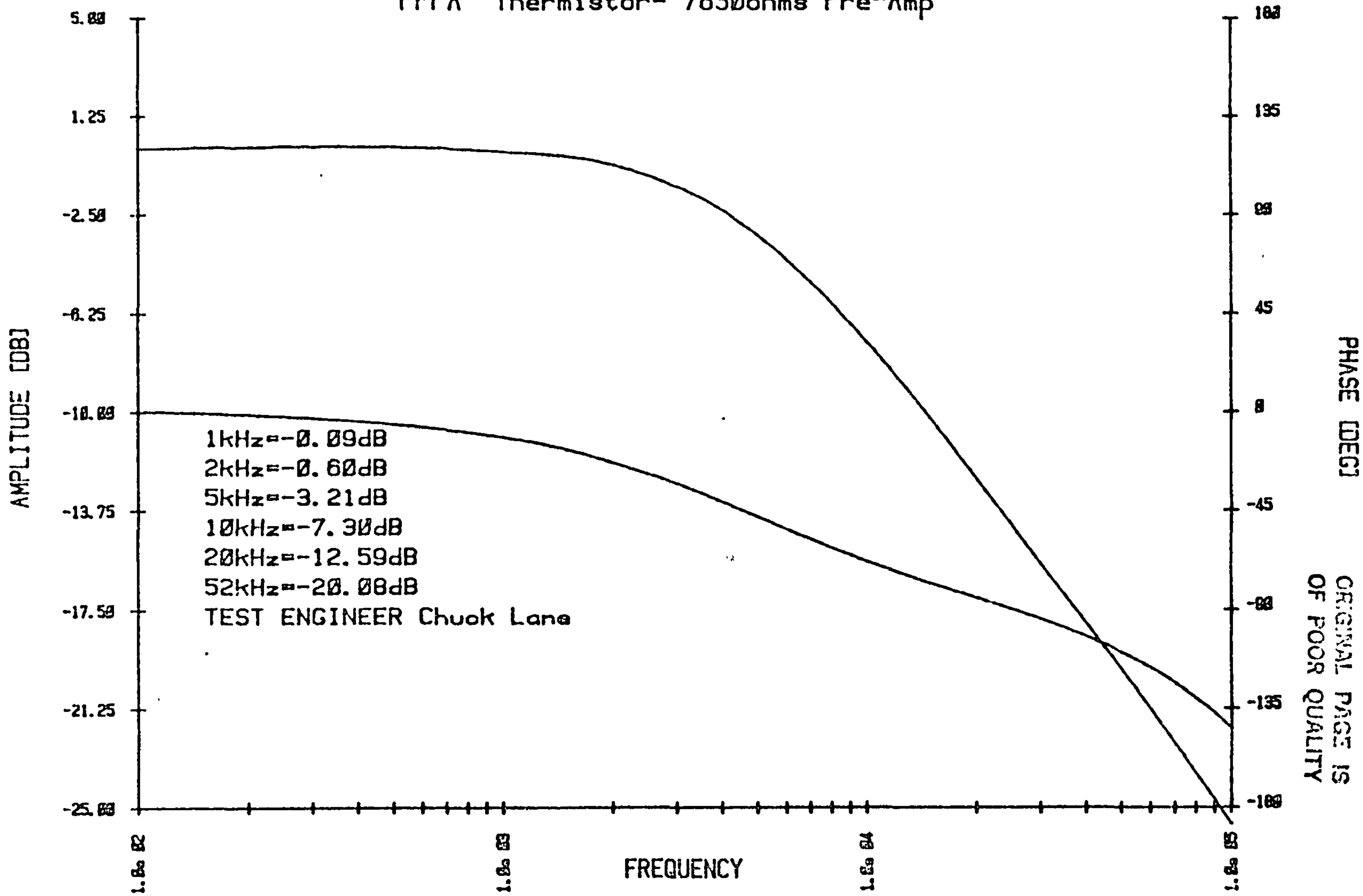
BAND 4 CHANNEL 5 Ø9/29/81

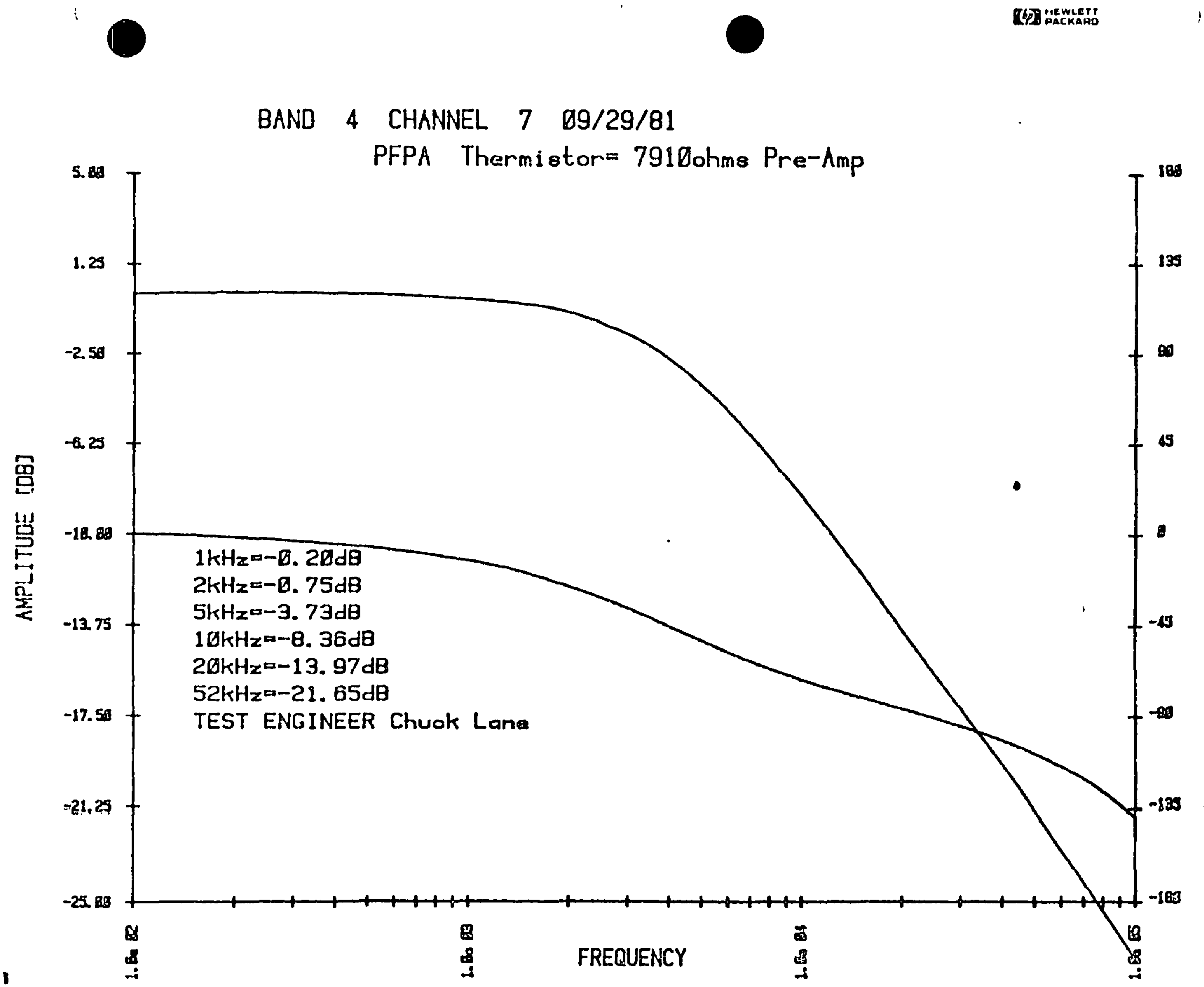
PFPA Thermistor= 784Øohms Pre-Amp



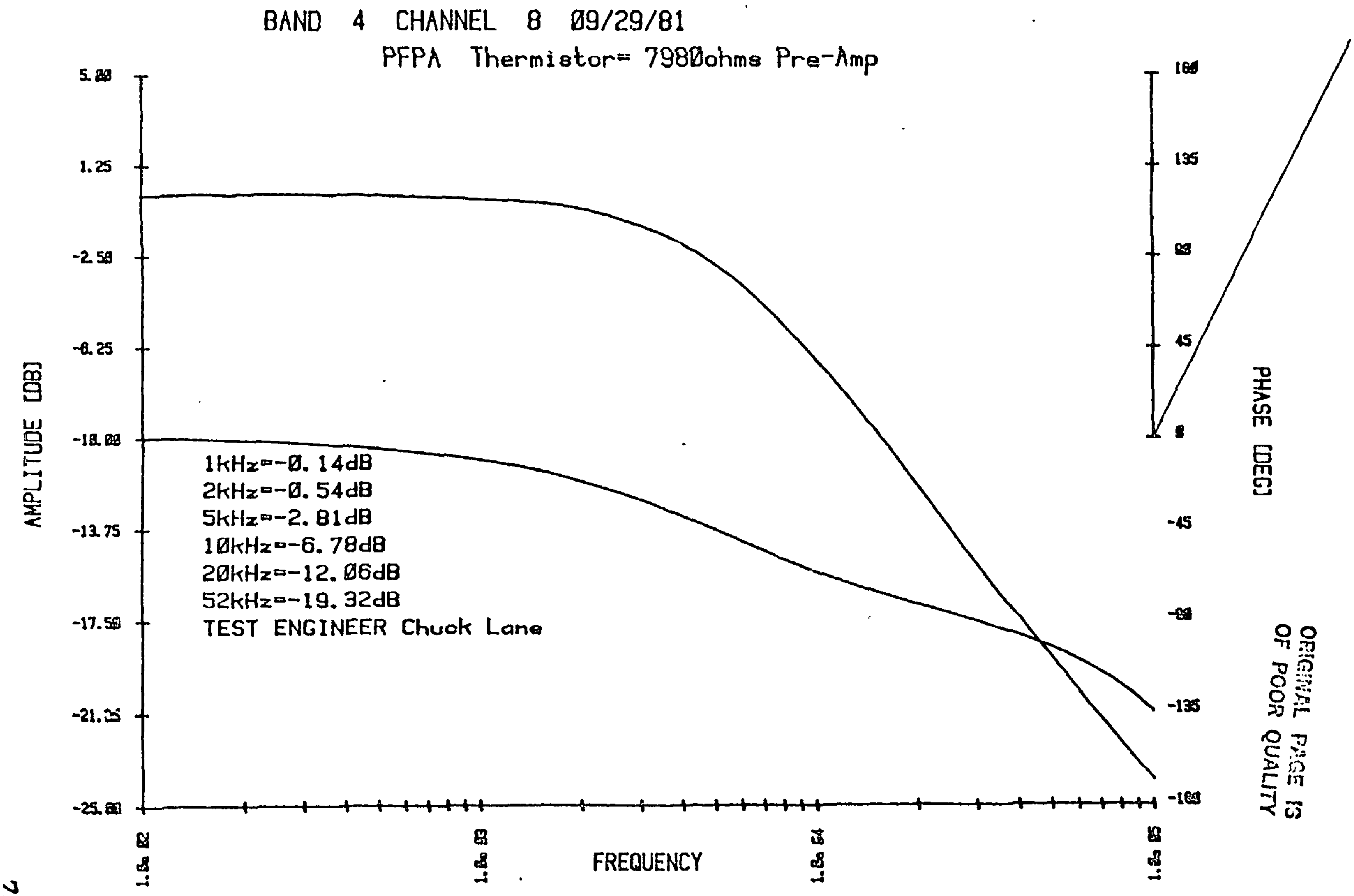
BAND 4 CHANNEL 6 09/29/81

PFPA Thermistor= 7830ohms Pre-Amp



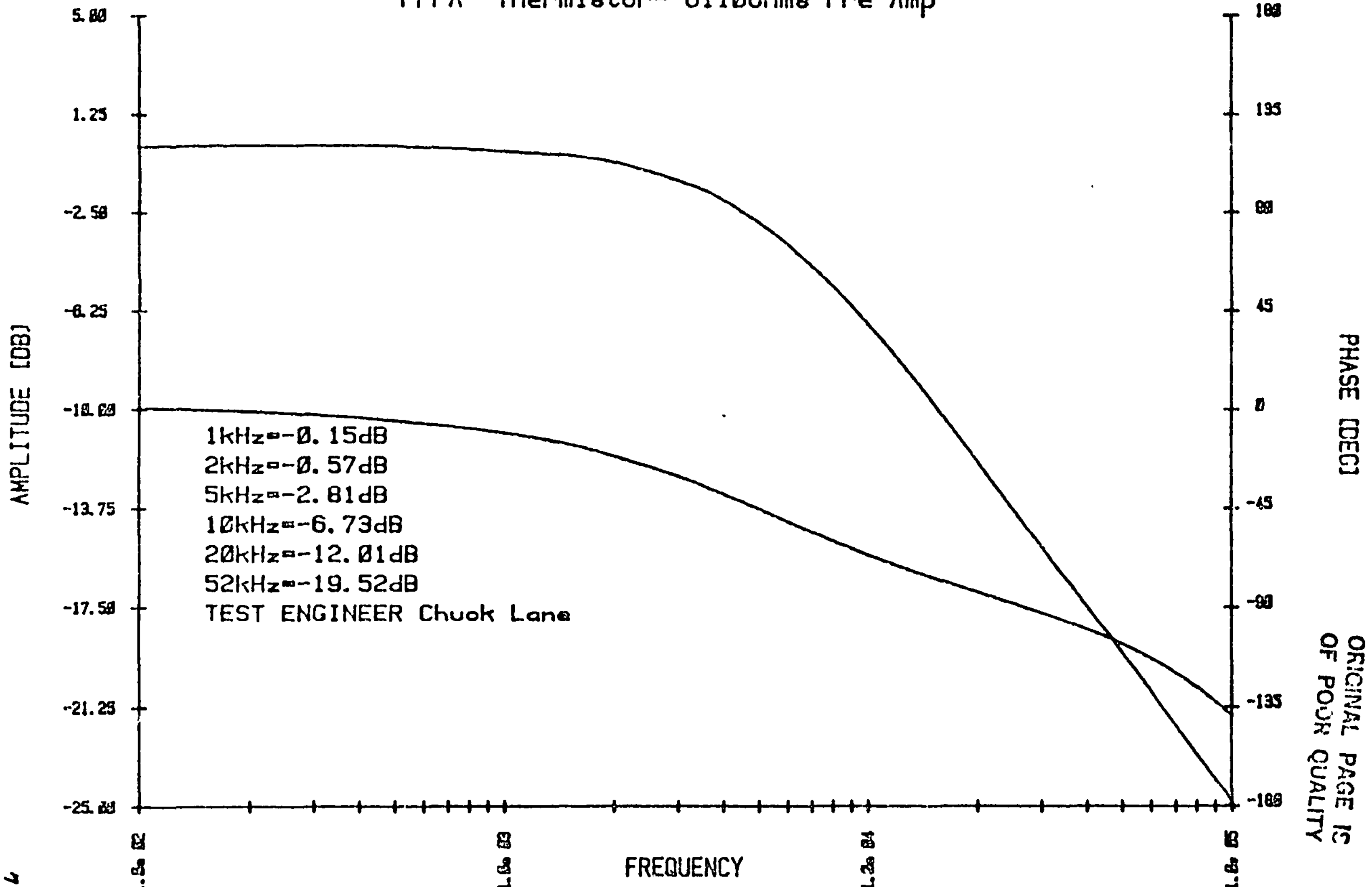


ORIGINAL PAGE IS
OF POOR QUALITY

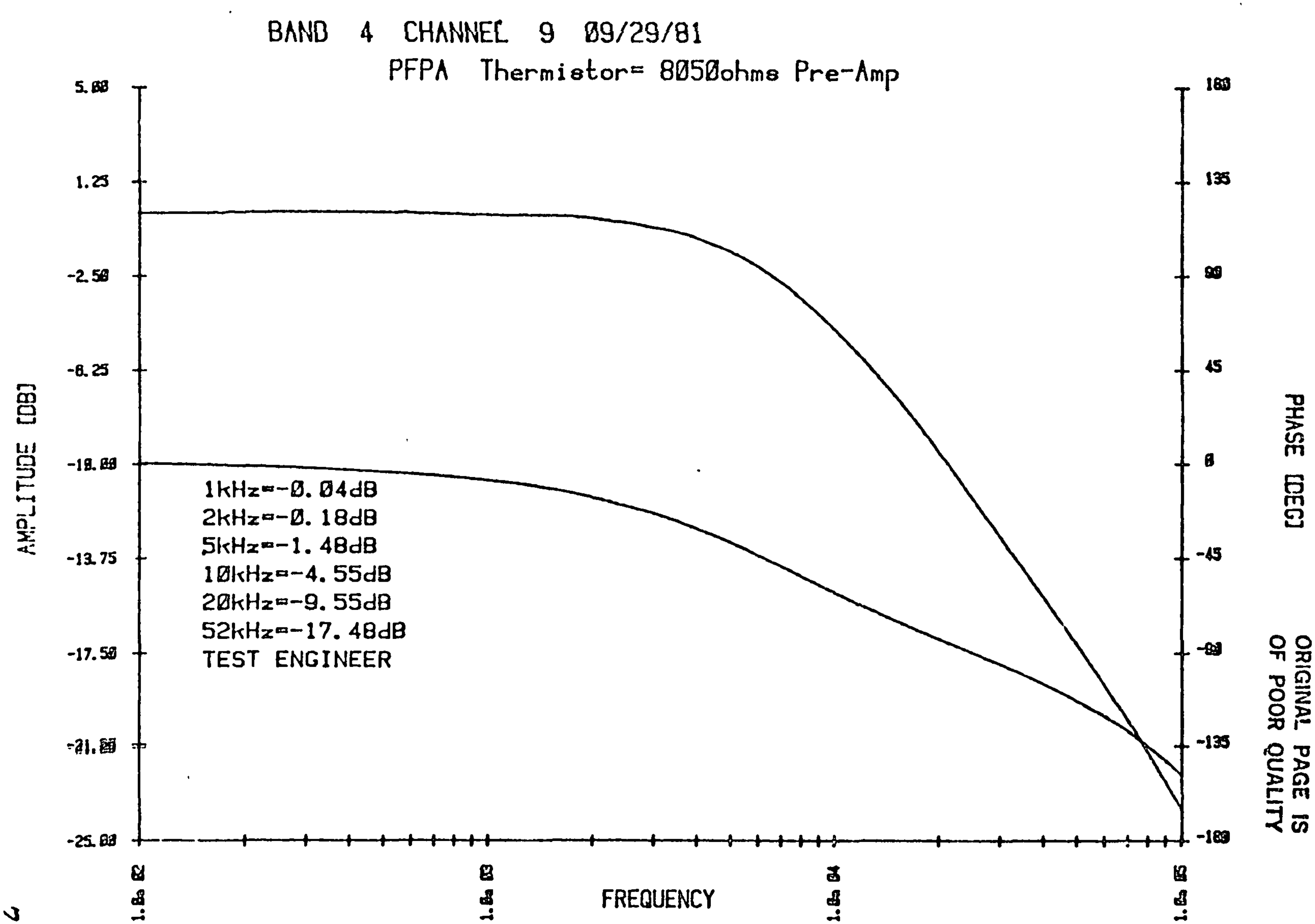

BAND 4 CHANNEL 8 09/29/81
PFPA Thermistor= 7980ohms Pre-Amp
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
1kHz=-0.14dB
2kHz=-0.54dB
5kHz=-2.81dB
10kHz=-6.78dB
20kHz=-12.06dB
52kHz=-19.32dB
TEST ENGINEER Chuck Lane
FREQUENCY
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180

BAND 4 CHANNEL 10 09/29/81

PFPA Thermistor= 8110ohms Pre-Amp



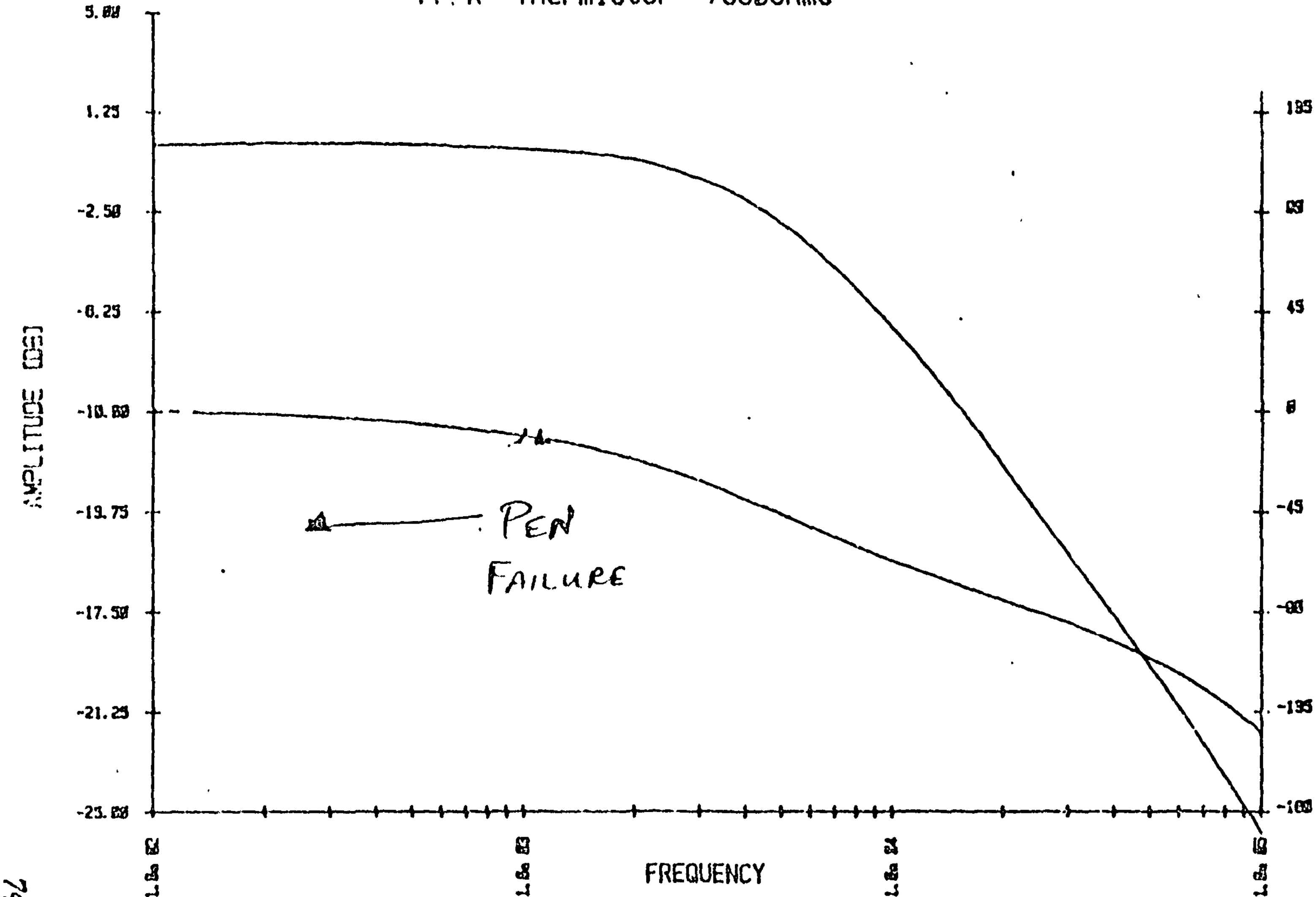
ORIGINAL PAGE IS OF POOR QUALITY



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4 CHANNEL 11

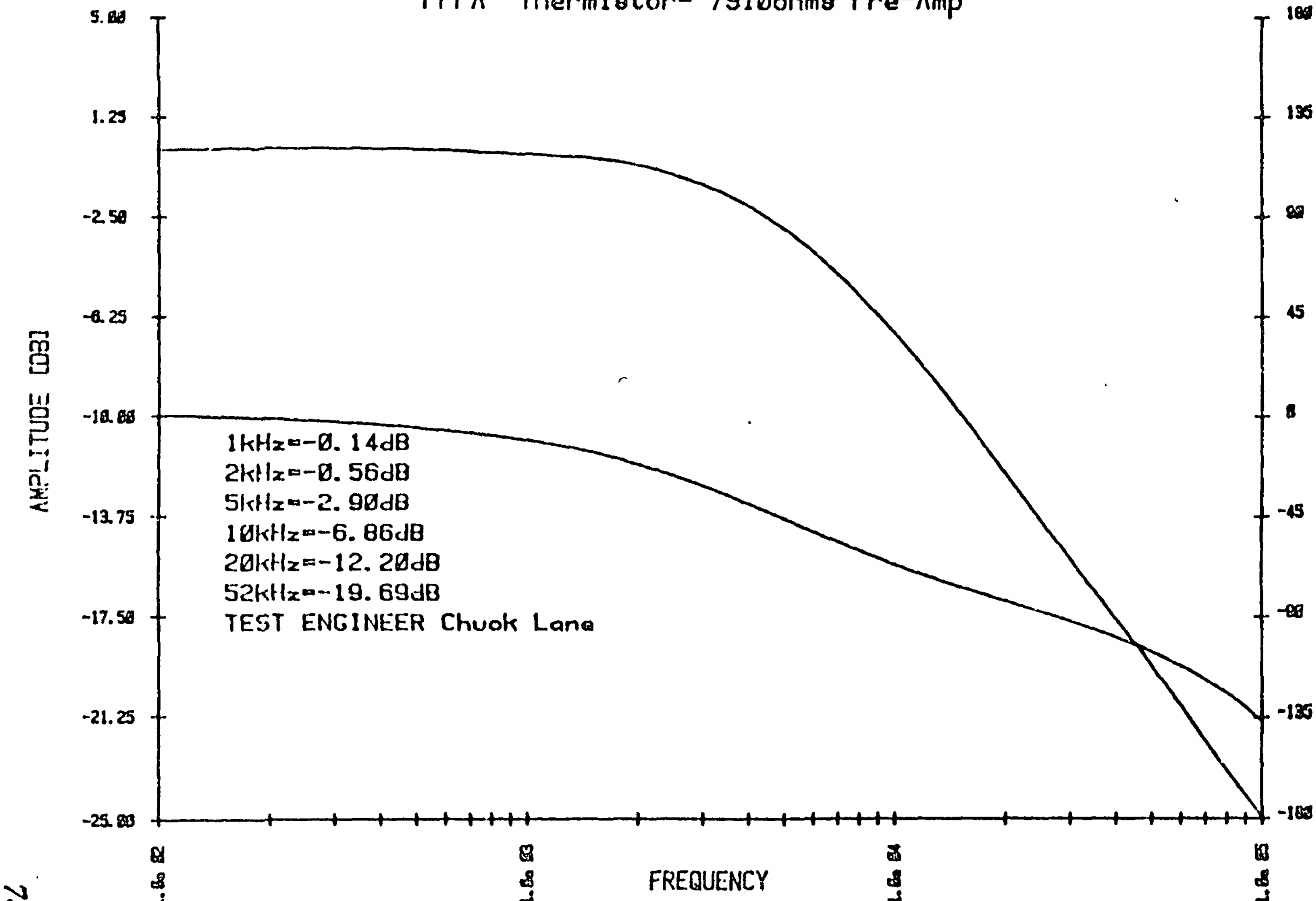
PFPA Thermistor= 7980ohms



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 12 09/29/81

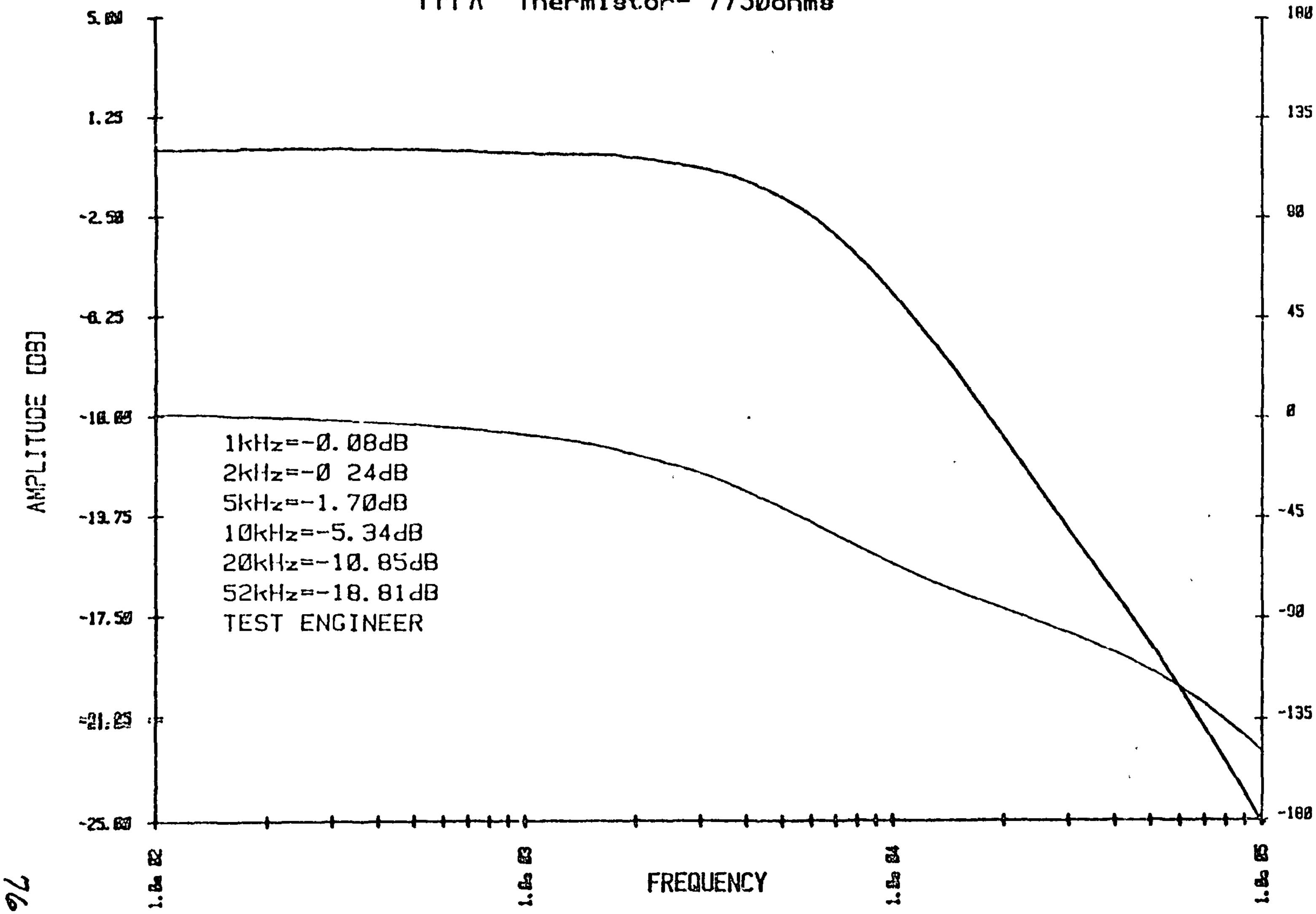
PFPA Thermistor= 7910ohms Pre-Amp



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4 CHANNEL 13

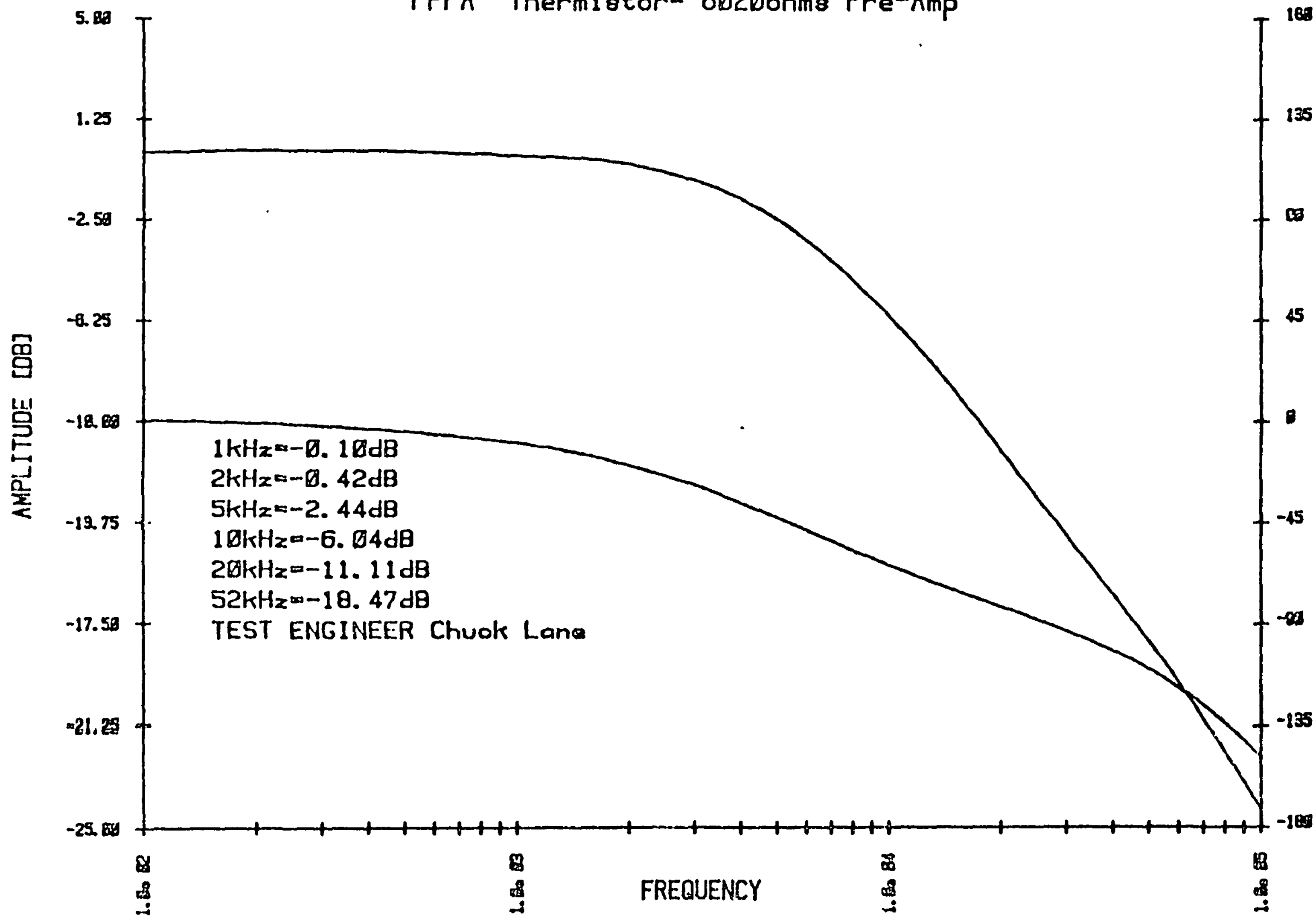
PFPA Thermistor= 7730ohms



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 14 09/29/81

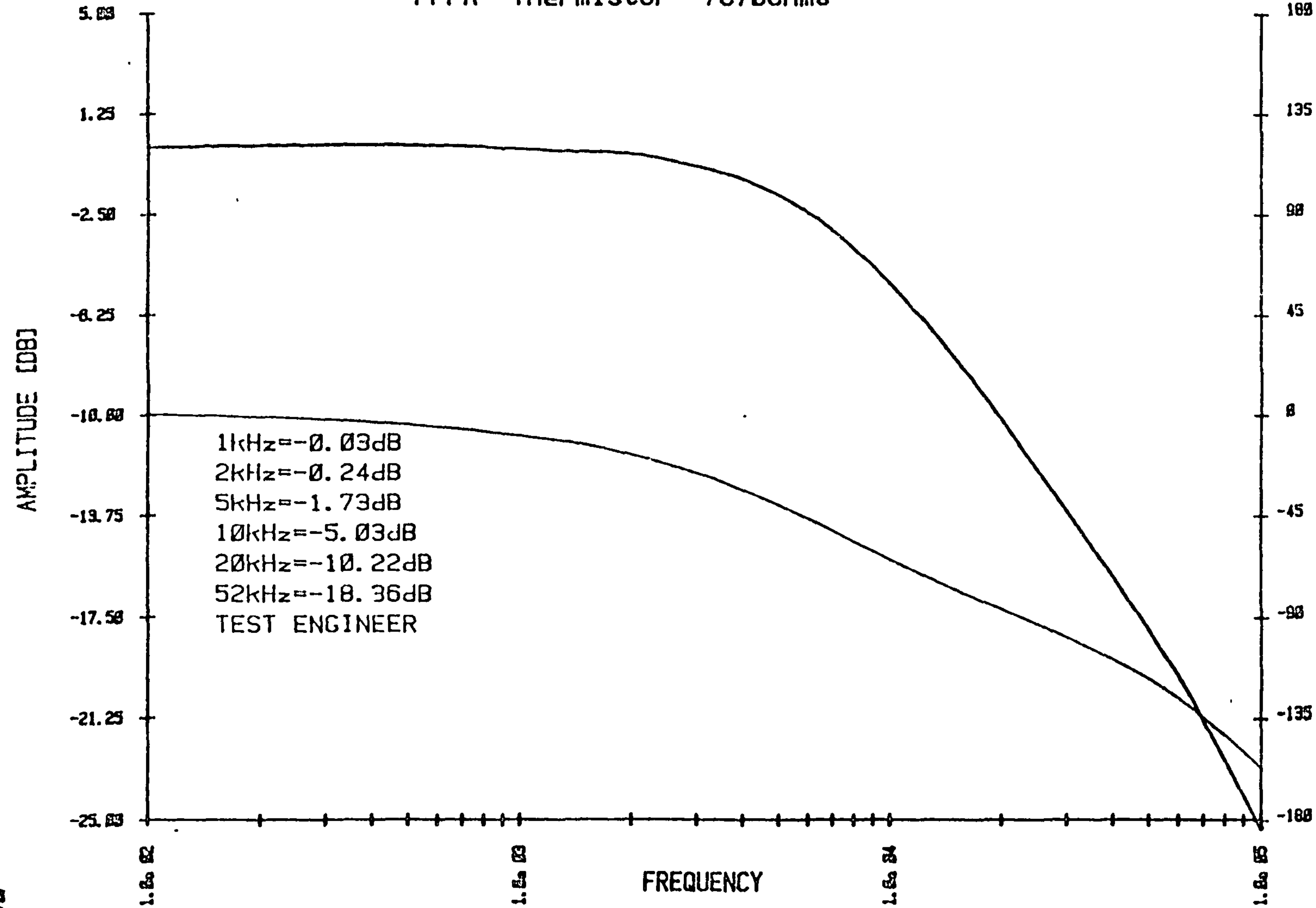
PFPA Thermistor= 8020ohms Pre-Amp



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 15

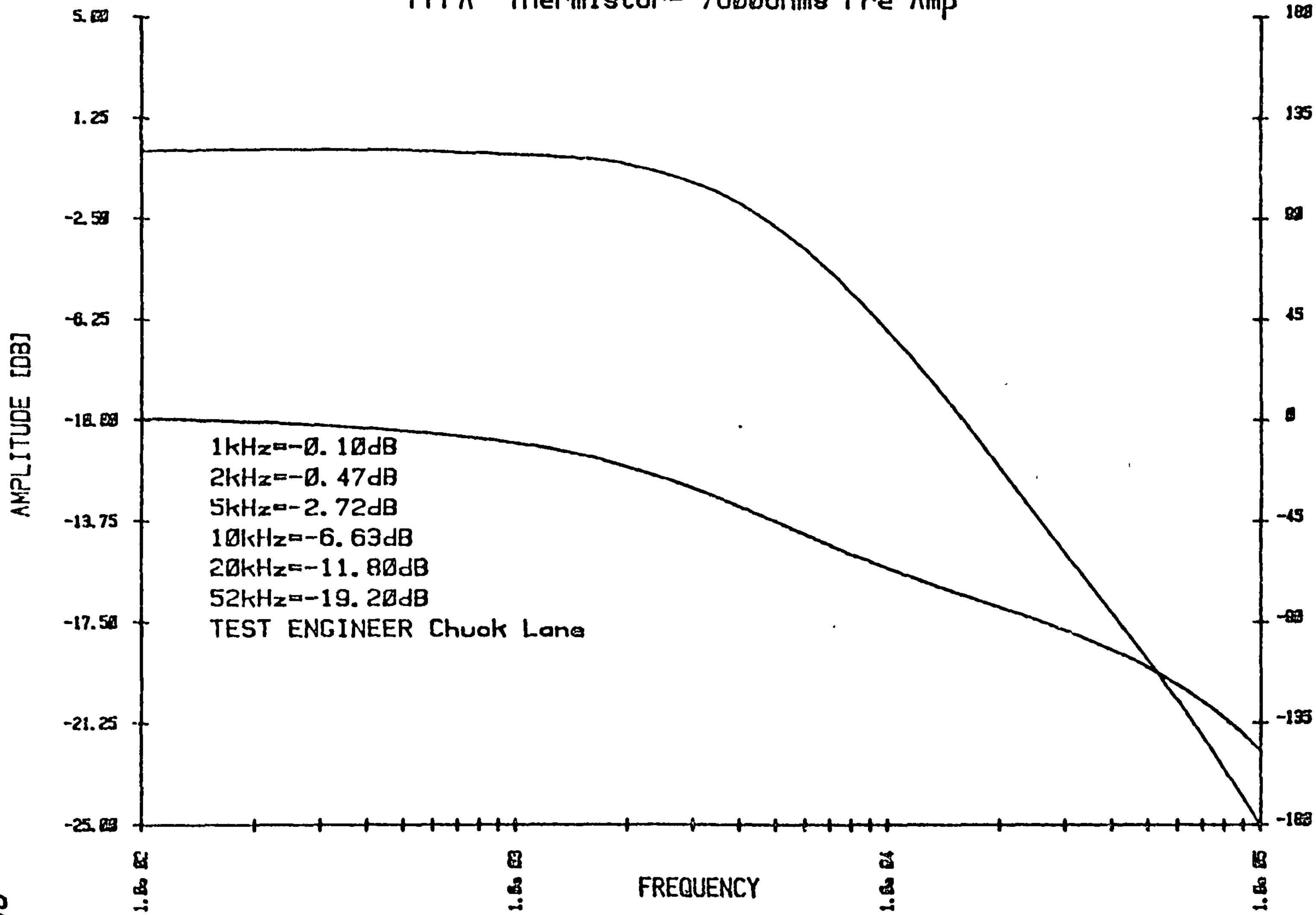
PFPA Thermistor= 7670ohms



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 16 09/29/81

PFPA Thermistor= 7800ohms Pre-Amp



ORIGINAL PAGE IS
OF POOR QUALITY

HEWLETT PACKARD

Band 4

Source Frequency= 50000 Hz   Date: 29 Sept 81

Chan	Nearest Neighbors Limit: -40dB				Non-Neighbors Average Limit: -60dB
1			Ch 2=-60	Ch 3=-41	Average=-58
2		Ch 1=-63	Ch 3=-50	Ch 4=-41	Average=-64
3	Ch 1=-43	Ch 2=-62	Ch 4=-89	Ch 5=-47	Average=-61
4	Ch 2=-46	Ch 3=-54	Ch 5=-75	Ch 6=-49	Average=-72
5	Ch 3=-42	Ch 4=-67	Ch 6=-65	Ch 7=-44	Average=-58
6	Ch 4=-48	Ch 5=-74	Ch 7=-62	Ch 8=-47	Average=-72
7	Ch 5=-45	Ch 6=-57	Ch 8=-58	Ch 9=-47	Average=-60
8	Ch 6=-49	Ch 7=-63	Ch 9=-63	Ch 10=-48	Average=-66
9	Ch 7=-46	Ch 8=-60	Ch 10=-57	Ch 11=-44	Average=-58
10	Ch 8=-49	Ch 9=-61	Ch 11=-57	Ch 12=-43	Average=-66
11	Ch 9=-47	Ch 10=-74	Ch 12=-58	Ch 13=-42	Average=-60
12	Ch 10=-50	Ch 11=-63	Ch 13=-58	Ch 14=-43	Average=-68
13	Ch 11=-47	Ch 12=-63	Ch 14=-57	Ch 15=-42	Average=-58
14	Ch 12=-45	Ch 13=-60	Ch 15=-60	Ch 16=-48	Average=-67
15	Ch 13=-46	Ch 14=-60	Ch 16=-56		Average=-58
16	Ch 14=-47	Ch 15=-57			Average=-66

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer: Chuck Lane

III SEPT. 29, 1981

REVISIONS

EFFECTIVITY	SYM	DESCRIPTION	DATE	APPROVED	
	A	INITIALLY RELEASED 8-22-79			
51065 S/N 001 & UP	B	REPLACES REV A WITH CHANGE AS REQUESTED BY ECR TM1202/01 TO UPDATE TEST PROCEDURE	1-7-80	MJS	
51065 S/N 001 & UP	C	Incorporated TM1357/01.(1-6) See Revision Notice.	80-2-13	mm:	MJS
51065 S/N 002 & SUBQ	D	INCORPORATED TM1433/01 RI AND TM1420/01. SEE REVISION NOTICE.	80-4-21		
51065 S/N 002 & SUBQ	E	Incorporated E.O. 9965 and E. O. 1684A.	80-11-19	BM	
51065 S/N 003 & SUBQ	F	Incorporated E.O. 2068A.	80-11-19	BM	NCJ
51065 SN 002 & SUBQ	G	INCORPORATED TM2220/01.(1) ADDED TO PARA 4.9. INCORPORATED EO'S 2972A & 2978A.	81-3-31		NCJ
51065 S/N 003 & SUBQ	H	Incorporated E.O. 2769A	81-5-14	NCJ	NCJ

FINAL TEST (CONTINUED) (paragraphs 4.4, 4.5 & 4.6 ONLY PER AHR 50797 STEP 2610.)
BAND 4

RETEST OF CHANNELS 6 & 8 AFTER HYBRID PRE-AMP WAS REPLACED FRIDAY OCT. 2, 1981

OCT. 5, 1981

REVISION STATUS THIS PRINT NOT MAINTAINED AFTER JUN 1 1981 DO NOT USE THIS PRINT UNLESS YOUR ORDER OR INSTRUCTIONS SPECIFY THE REVISION LEVEL SHOWN

ORIGINAL PAGE IS OF POOR QUALITY

(3342A) 3654A

CONTRACT NO. NAS 5-24200	SANTA BARBARA RESEARCH CENTER A Subsidiary of Hughes Aircraft Company GOLETA, CALIFORNIA
1-2-80 / 1-2-80 / 1-3-80	TITLE TEST PROCEDURE, TM BANDS 1-4 SIGNAL CHANNEL ELECTRONICS
1-7-80 / 1-9-80	SIZE A / CODE IDENT NO 11323 / NUMBER 16597
	SCALE / SHEET 1 OF 20

ORIGINAL PAGE IS
OF POOR QUALITY

1.0 SCOPE

This document describes the functional test of the Silicon Detector and Preamplifier Assembly, 50797, and the Post-amplifier Circuit Board for Bands 1-4, 50904. Together these make up 16 complete channels, or one spectral band, of TM signal electronics. In preparation for the test, the 50797 assembly is mounted in the 75729 bonding and test fixture. A modulated LED is focussed on each individual detector. The postamp boost and rolloff resistors are set for each channel to provide proper frequency response from 100 Hz to 52 kHz and transient response to a 10 μs ramp. Wideband noise is measured for each channel. Crosstalk is measured from each channel to all other channels at 50 kHz. Once a preamp and postamp assembly are tested together, it is intended that they be installed in the same band location in the TM instrument.

2.0 APPLICABLE DOCUMENTS

2.1 SBRC Documents

The following documents specify the electrical assembly design and are for use in identifying details necessary in testing.

Drawings

50797	Silicon Detector & Preamplifier Assembly
50805	Electronic Diagram, Silicon Detectors & Preamplifiers
50904	PWB Assembly, Postamplifier, Band 1-4
52732	Parts, Electronics Select, TM
50905	Elec. Diagram, Postamplifier, Band 1-4
75918	Detector Array Alignment Fixture Assembly
76600	Full Band Test Set
76601	Voltage to Current Converter
76602	Optical Fiber

3.0 TEST EQUIPMENT REQUIRED (OR EQUIVALENT)

ORIGINAL PAGE IS OF POOR QUALITY

3.1 Full Band Test Set, SBRC Drawing 76600

The test set contains connectors to mate with the Detector and Preamplifier Assembly, a connector to accept the post-amplifier circuit board, a selector switch to monitor preamp and postamp outputs and potentiometers for adjusting the boost and rolloff resistance.

3.2 Oscilloscope

Tektronix type 547 oscilloscope with a 1 A7A plug-in, or equivalent.

3.4 Wave Analyzer

Hewlett Packard 3591A selective voltmeter, or equivalent, is used to measure crosstalk.

3.5 True RMS Voltmeter

Hewlett Packard 3400A, or equivalent, to measure frequency response and wideband noise.

3.6 Detector Array Alignment Fixture Assembly, SBRC Dwg. 75918

This assembly contains a microscope with a photometric eye-piece which allows the light from an optical fiber to be focussed onto an individual detector element.

3.7 Optical Fiber, SBRC Dwg. 76602

An optical fiber about 2 feet long is used between the light emitting diode (LED) and the alignment fixture assembly so the LED drive signal current will not be picked up by the high impedance focal plane circuitry.

3.8 Light Emitting Diode

Laser Diode Laboratories, type 639AS3831.

3.9 Voltage-to-Current Converter, SBRC Dwg. 76601

This box drives the LED with a current proportional to its voltage input.

ORIGINAL PAGE IS
OF POOR QUALITY

3.10 Function Generator

Wavetek type 147 drives the voltage-to-current converter for the frequency response and crosstalk tests.

3.11 Pulse Generator

Data pulse type 116 drives the voltage to current converter for the transient response test.

3.12 Integrator/Averager

PAR type 162 is used to improve the signal to noise ratio during the transient response test. The model 164 gated integrator plug-in is used.

3.13 Plotter

Hewlett Packard type 7044A is used with the Integrator/Averager.

3.14 Automatic Equipment

The following equipment is used when testing is performed in other than the manual mode.

3.14.1 Network Analyzer - The HP 3042 Network Analyzer consists of a 3308B Synthesizer, 3570A Network Analyzer and a 9825S Desk Top Computer.

4.0 PROCEDURE

4.1 Inspection

Check to see that nominal component values have been installed on the postamp board at C33-48, R1-16, R17-32, R33-48, R65-80 and R81-96. The nominal values are shown on the postamp assembly drawing 50904 as a function of the intended band number (1-4). The assembly drawing also gives a 52732 Select List Dash Number for each select component also as a function of intended spectral band. The final selected value must be chosen from the values in the list.

4.2 Setup

Attach the 50797 Detector Preamplifier Assembly (mounted in the bonding and test fixture) to the baseplate of the Detector Array Alignment fixture. Focus the microscope on detector element number 1 of 16. Connect the sinewave generator, voltage-to-current converter, LED and optical fiber. Locate the LED as far as possible from the detector-preamp assembly. Insert the postamp board into the test set socket.

4.3 Supply Current

ORIGINAL PAGE IS
OF POOR QUALITY

Apply $\pm$21V $\pm$0.5V to the test set following the indicated polarity. Limit the currents to 200 mA. Turn on the supply and record the currents as indicated on the supply meters.

4.4 Offset Adjustment

Connect the test set postamplifier high and low outputs to the + and - inputs of the oscilloscope preamplifier. Adjust the nominal 20 KΩ offset resistor in each channel to produce a differential offset voltage, $V_{OH} - V_{OL}$, of 0 $\pm$ 1V. Record the offset voltage and resistor value. The focal plane assembly must be dark for this test.

4.5 Low Frequency Gain Adjustment

Connect the true-reading rms voltmeter to the oscilloscope preamplifier output. Adjust the sinewave generator to produce a 4 v $\pm$ 1 v pk-pk 100 Hz undistorted sinewave on the scope. In each band select the channel whose feedback resistor is closest to the nominal value (1.0×10^9 ohms). Adjust the pre-gain resistors on the postamp board so that the gain value for each of the other channels matches that of the selected channel $\pm$ 5%. Resistors are to be replaced at the conclusion of this test. Record the final resistor values.

NOTE: When testing Band 4 only, postamp board resistors R33 through R48 (Post-gain resistors) must be lifted from the circuit board at one end. Otherwise a 4V pk-pk signal will not be attainable. Resistors are to remain lifted throughout the remainder of this test.

4.6 Frequency and Transient Response Adjustment

Measure the response to a 10 µs ramp using the pulse generator, voltage-to-current converter, light emitting diode, optical fiber and microscope. Adjust the boost control on the test box for flattest response in the 30 to 500 µs region after the ramp. Now reconnect the function generator and set the rolloff control on the test box for -3.0 db at 52 kHz. These controls are interactive so several iterations may be required.

The final setting should result in the transient response reaching final value within 1% after 60µS and within 1.5% after 35µS. Record the maximum overshoot (limit = 10%) and the 2 to 98% risetime (limit = 20µS). The frequency response should be -(3 +0/0-0.5) dB at 52 kHz. Record the boosted frequency response on the data sheet for the boost and rolloff settings obtained. Plot the transient response using the Integrator/Averager and the plotter.

It may be necessary to add capacitance at C33-C48 to meet the requirement. If capacitance is added, record the values on the data sheet. If no capacitor is required, enter 0 for value and make note that capacitor was not needed.

4.7 Wideband Noise

With the boost and rolloff set as in paragraph 4.6, measure the wideband noise on the true rms meter. It shall be less than (2.4 pA) (Rf) where Rf is the feedback resistor value in the channel being tested. Record the noise on the data sheet.

4.8 Crosstalk - Using the wave analyzer at the 1A7A signal output and the sinewave light source driver with the voltage-to-current converter, measure the crosstalk from each channel to its four nearest neighbors at 50 kHz. (Channel 1 has only 2 nearest neighbors: 2 and 3. Channel 2 has 3: 1, 3 and 4. Channel 3 has 4: 1, 2, 4, and 5. Also record the average crosstalk from each channel to its 11 non-neighbors. The measured crosstalk shall be less than 1% (-40 dB) for nearest neighbors and less than 0.1% (-60 dB) for non-neighbors.

.9 Ground Continuity and Isolation

Turn off power. Remove connectors. Measure <11 ohms between J1-16 and:

J1-27	J2-6
J1-23	J2-10
J1-1	J2-31
J1-6	J2-27

Record maximum reading of Data Sheet.

Measure >1 MΩ between J1-16 and

J1-18	J2-15
J1-11	J2-21

Check Data Sheet O.K.

Measure >1 MΩ between J1-16 and the FPA aluminum mounting fixture.

Check Data Sheet O.K.

Measure <25Ω between J1-16 of odd channels and J1-16 of even channels for Bands 1, 2, 3 and 4. Check data sheet O.K.

4.10 Time Delay

Measure the Time Dealy between the 50% points of the led drive current waveform transition and the corresponding channel output waveform transition. Display both waveforms on the oscilloscope, using a dual trace plug-in with external sync and 2μS/CM sweep time. Photograph the rise and fall separetely for each channel. Record the delays on the Data Sheet. They shall be TBD ±0.5μS.

ORIGINAL PAGE IS
OF POOR QUALITY

5.0 QUALITY ASSURANCE PROVISIONS

ORIGINAL PAGE IS OF POOR QUALITY

5.1 Notification of QA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by QA Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All Flight Assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

5.4 Failures

Problems/failures encountered during testing of flight hardware shall be handled in accordance with Thematic Mapper Product Effectiveness Plan HS236-0066A.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer, QA Engineer, and Design Engineer. When the QA Engineer has not witnessed the test he should sign the data sheet after it is reviewed by the Design Engineer. A typical data sheet format is included at the end of this procedure.

6.2 Distribution of Test Records

After the test data sheet is signed, place one (1) copy in the traveling file, one(1)copy and the original in the Engineering file, and give one (1) copy to QA.

C-4

ORIGINAL PAGE IS OF POOR QUALITY

TEST DATA RECORD

Detector Preamplifier Assembly 50797, S/N 401 contains 51015 assemblies S/N 203 and 206-1, odd and even channels, respectively.

Postamplifier Circuit Board Assembly 50904, S/N 201

Intended for TM Spectral Band 4.

Feedback Resistor values from data sheets for specification 16306

ODD		Even	
1	.97	2	.91
3	1.05	4	.95
5	1.22	6	1.05
7	1.06	8	.94
9	.84	10	.98
11	.91	12	.84
13	.88	14	.84
15	.84	16	.83

4.3 Power Supply Current
Limit: 200mA
+ 21V 175 mA
- 21V 175 mA

Test Engineer C. R. LANE Date 10-4-81

Test Supervisor [signature] Date 10-5-81

Quality Control Stamp 118 VERIFY [signature] Date 10-5-81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 9

4.4

ORIGINAL PAGE IS
OF POOR QUALITY

Channel	Resistor	Value	908600-( )	Measured Offset Voltage	Limit: 0.0 ± 1.0 V
1	R17				
2	R25				
3	R18				
4	R26				
5	R19				
6	R27	19.6k	-250	+1.3V	*
7	R20				
8	R28	22.1K	-255	+1.5V	*
9	R21				
10	R29				
11	R22				
12	R30				
13	R23				
14	R31				
15	R24				
16	R32				

Test Engineer C. R. Lane Date 10-04-81

Test Supervisor Neill Chaison Date 10-5-81

Quality Control Stamp VERIFY PB Ryan Date 10-5-81

ENTERED IN ERROR

*CH 6, 8 OUT OF SPEC

PBR 10-9-81

REF FR 5326

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 10

FORM NO. 2122

4.5 Pregain Resistors

ORIGINAL PAGE IS OF POOR QUALITY

LIMITS:

Band 1: 4.87K to 16.2K
2: 4.12K to 11.8K
3: 2.61K to 5.90K
4: 8.23K to 100K

Channel	Resistor Value	908600-( )
1	R81	
2	R89	
3	R82	
4	R90	
5	R83	
6	R91	
7	R84	
8	R92	
9	R85	
10	R93	
11	R86	
12	R94	
13	R87	
14	R95	
15	R88	
16	R96	

N/A

Test Engineer ______________ Date ______________

Test Supervisor [signature] Date 10-5-81

Quality Control Stamp 118 VERIFY P G Ryan Date 10-5-81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 11

4.6 Transient Response

Maximum excursion from final value after time $t_0 + t$ where t_0 is the time when the response reaches 2% of final value.

Ch	t_0 + ~~35~~ 30 µS Limit = 1.5%	t_0 + 60µS Limit = 1.0%
1		
2		
3		
4		
5		
6	1.5 ~~1.0~~ %	.50 %
7		
8	1.0 ~~.75~~ %	.25 %
9		
10		
11		
12		
13		
14		
15		
16		

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer C. R. LANE Date 10-4-81

Test Supervisor Orville C. Swanson Date 10-5-81

Quality Control Stamp 118 VERIFY P G Ryan Date 10-5-81

SIZE	CODE IDENT NO.	NUMBER
A	11323	16597
SCALE	REV H	SHEET 12

FORM NO. 0 22 1 A 1-3 69 DIETZGEN POST CLEARPRINT 1020H

	OVERSHOOT	RISETIME
Ch. 1		
2		
3		
4		
5		
6	9.5 %	12.5 µS
7		
8	6.0 %	14.0 µS
9		
10		
11		
12		
13		
14		
15		
16		
	Limit: 10 %	Limit: 20 μsec

ORIGINAL PAGE IS
OF POOR QUALITY

Test Engineer C. R. LANE Date 10-4-81

Test Supervisor [illegible] Date 10-5-81

Quality Control Stamp VERIFY 118 PB Ryan Date 10-5-81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 13

ORIGINAL PAGE IS
OF POOR QUALITY

4.6 Boosted Frequency Response:

Limits (dB)	100Hz 0		1 kHz ±0.5		2 kHz ±0.5		5 kHz ±0.5	
Ch 1		db		db		db		db
2								
3								
4								
5								
6	0		.1		.1		.2	
7								
8	0		.1		.1 .2 rca		.2	
9								
10								
11								
12								
13								
14								
15								
16								

Test Engineer C. R. LANE Date 10-~~4~~-81

Test Supervisor [signature] Date 10-5-81

Quality Control Stamp I 118 VERIFY P G Ryan Date 10-5-81

SIZE	CODE IDENT NO.	NUMBER
A	11323	1659 7
SCALE	REV H	SHEET 14

Limits (dB)	10 kHz +0.4 -0.6		20 kHz +0.4 -0.6		52 kHz -(3 +0/-0.5)	
Ch 1		db		db		db
2						
3						
4						
5						
6	.3		.4		-2.24*	
7						
8	.2 ~~.02~~		.02		-2.86	
9						
10						
11						
12						
13						
14						
15						
16						

ORIGINAL PAGE IS OF POOR QUALITY

Test Engineer C. R. LANE Date 10-4-81

Test Supervisor [signature] Date 10-5-81

Quality Control Stamp VERIFY Date 10-5-81

ENTERED IN ERROR 118

* DATA OUT OF SPEC REF FR 8321

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 15

ORIGINAL PAGE IS
OF POOR QUALITY

4.6

Channel	Boost Resistor Values	908600-( )	Rolloff Resistor Value	908600-( )
1	R1		R65	
2	R9		R73	
3	R2		R66	
4	R10		R74	
5	R3		R67	
6	R11		R75	
7	R4		R68	
8	R12		R76	
9	R5		R69	
10	R13		R77	
11	R6		R70	
12	R14		R78	
13	R7		R71	
14	R15		R79	
15	R8		R72	
16	R16		R80	

N/A

Test Engineer ______________ Date ______________

Test Supervisor [signature] Date 10-5-81

Quality Control Stamp I 118 VERIFY [signature] Date 10-5-81

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 10

FORM NO. 0133-1-A (3-69) DIETERICH-POST CLEARPRINT 1000H

LIMIT:
<.4 pA

Ch	METER	POST-AMP OUT (dB)	PRE-AMP OUT (dB)	SCOPE GAIN (dB)	PRE-AMP OUT (mV)	FEEDBACK RESISTOR x10⁹Ω	WIDEBAND NOISE(pA)
1	.60V	+5.2	-17.2	27.6	1.91	.97	2.0
2	.63	+5.6	-17.3		1.88	.91	2.1
3	.75	+5.7	-16.4		2.45	1.05	2.3
4	.69	+5.6	-18.3		1.84	.95	1.9
5	.60	+5.4	-16.5		2.00	1.02	2.0
6	.71	+5.6	-17.0		2.18	1.05	2.1
7	.61	+5.6	-16.2		2.07	1.06	2.0
8	.63	+5.3	-17.5		1.90	.94	2.0
9	.61	+5.4	-18.3		1.66	.84	1.9
10	.70	+5.3	-17.5		2.11	.98	2.2
11	.67	+5.4	-17.3		2.05	.91	2.3
12	.64	+5.7	-18.2		1.70	.84	2.0
13	.68	+5.5	-18.1		1.87	.88	2.1
14	.63	+5.7	-18.1		1.69	.84	2.0
15	.66	+5.4	-18.4		1.77	.84	2.1
16	.61	+5.7	-17.4	27.6	1.78	.83	2.1

Test Engineer C. R. Lane Date 10-04-81

Test Supervisor [illegible] Date 10-5-81

Quality Control Stamp VERIFY 118 PB Ryan Date 10-5-81

ORIGINAL PAGE IS OF POOR QUALITY

SIZE	CODE IDENT NO	NUMBER
A	11323	16597
SCALE	REV H	SHEET 19

PRECEDING PAGE BLANK NOT FILMED

4.9 Ground Continuity and Isolation

REQUIREMENTS:

Signal GND Continuity	6.8 Ohms	Limit: (< 11 Ohms)	
Signal GND-PWR Gnd Isolation	✓	OK	(>1 M ohms)
Signal GND-Chassis Isolation	✓	OK	(>1 M ohms)
J1-16 ODD to J1-16 EVEN	✓	OK	(<25 ohms all bands)

4.10 Time Delay

Channel	Rise Time	Fall Time
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

N/A

ORIGINAL PAGE IS OF POOR QUALITY

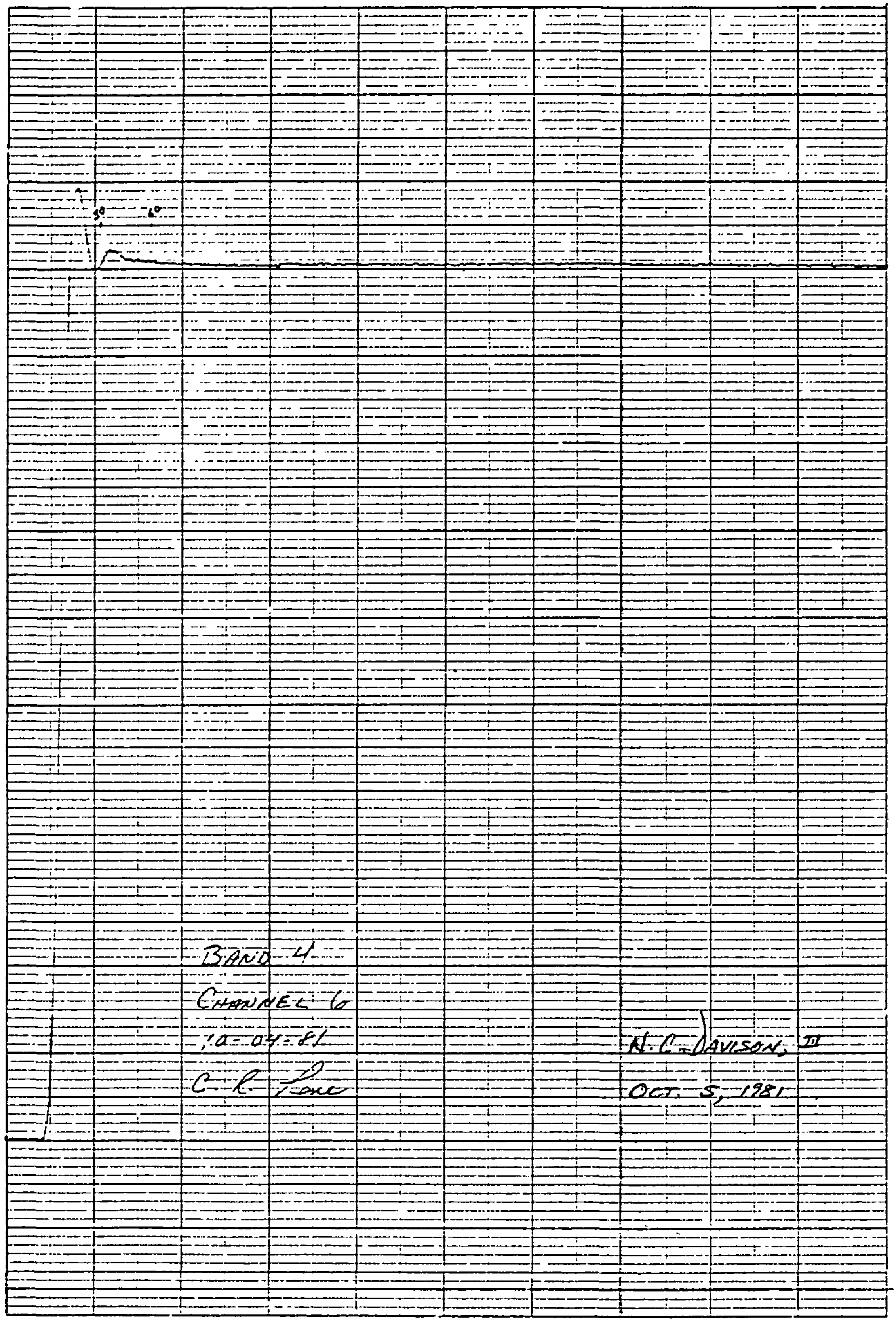
Test Engineer G. R. Love Date 10-05-81

Test Supervisor [signature] Date 10-5-81

Quality Control I 118 VERIFY PJ Ryan Date 10-5-81

PRECEDING PAGE BLANK NOT FILMED

SIZE	CODE IDENT NO.	NUMBER
A	11323	16597
SCALE	REV ##	SHEET 20



5°
6°
BAND 4
CHANNEL 6
10-04-81
N. C. DAVISON, III
OCT. 5, 1981

ORIGINAL PAGE IS
OF POOR QUALITY

BAND 4
CHANNEL 8
10-05-81
C. R. Love

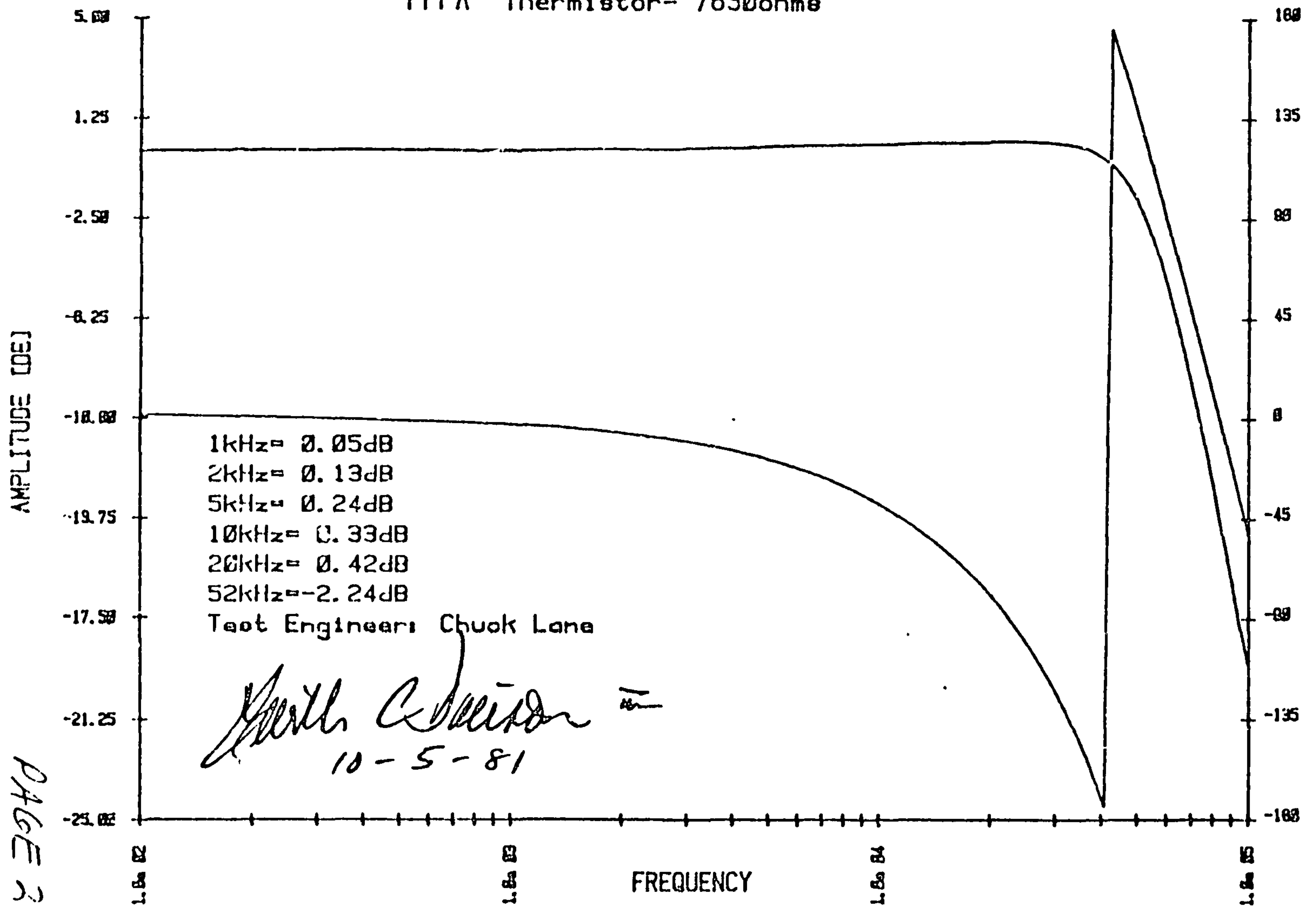
N. C. DAVISON, III
OCT. 5, 1981

TEMP CONTROLLER
TO CLIMATE

HEWLETT PACKARD 9270-1004

BAND 4 CHANNEL 6 10/04/81

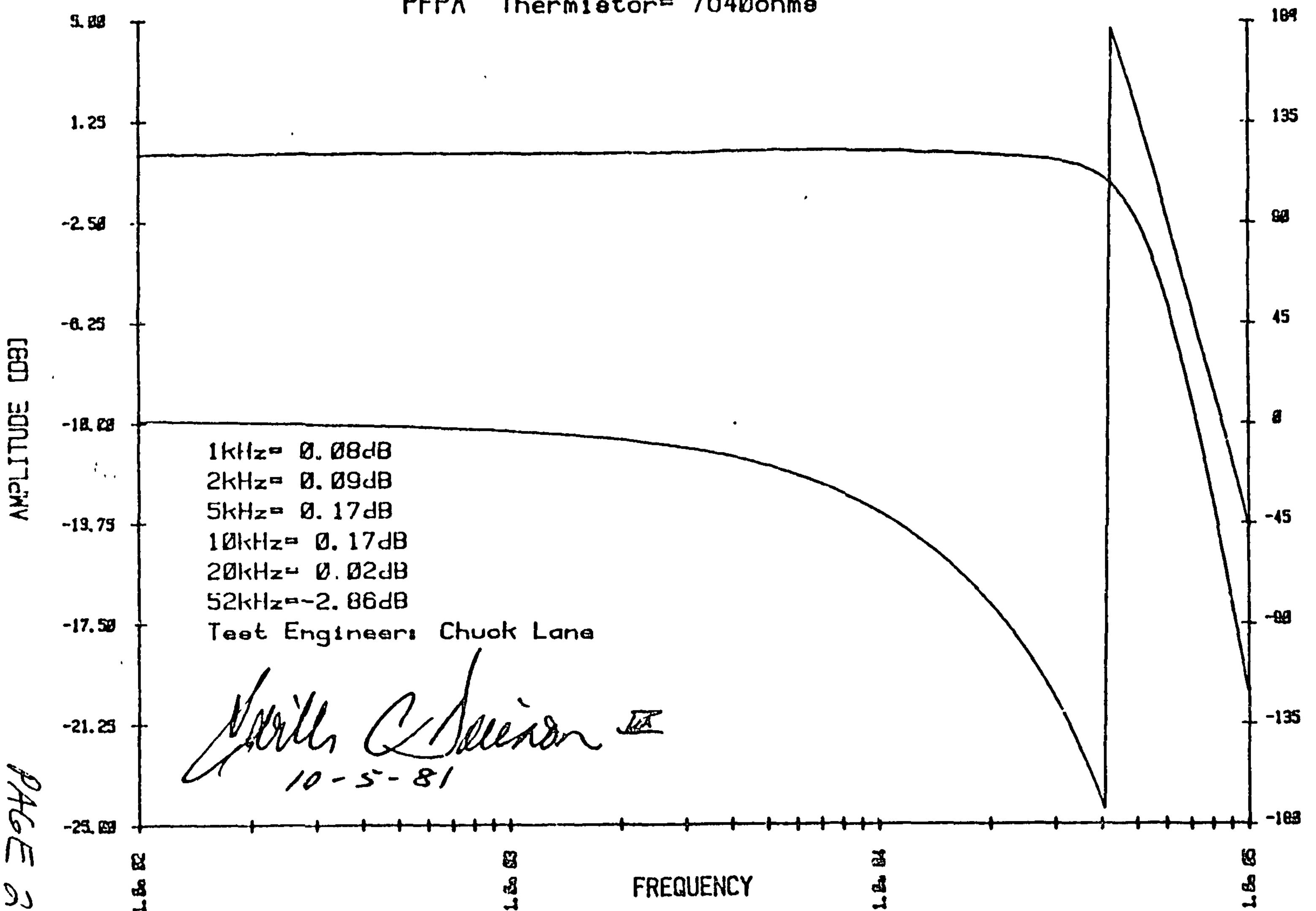
PFPA Thermistor= 7830ohms



ORIGINAL PAGE IS OF POOR QUALITY

BAND 4 CHANNEL 8 10/04/81

PFPA Thermistor= 7640ohms



ORIGINAL PAGE IS
OF POOR QUALITY

TM CFPA

FLIGHT BAND #5

S/N 201

ORIGINAL PAGE IS OF POOR QUALITY

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 3-4-82

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS DESIG.	d. DEV/WAIVER NO
F	11323	TM	W-142

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR NO.
11323	50973	B	2870A

9. TITLE OF DEVIATION/WAIVER: Permission to use F-1 CFPA with discrepant substrate

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Substrate CFPA

16. PART NO OR TYPE DESIG.: 50956-D

17. LOT NO.: 013

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: >2,000,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: >1.5 years if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to use the F-1 CFPA with the following discrepancies against its substrate:

1) Assembly was built to planning which was never reviewed and accepted by AF and contains no inspections of any kind. 2) Depositions were performed without released process procedures (none referenced in AHR). 3) Resistance measurement data attached to AHR indicates substrate did not meet requirement specified in Drawing Note 15. 4) Deposition thickness not recorded at Operation 3150.

24. NEED FOR DEVIATION/WAIVER

This substrate cannot be replaced without completely rebuilding the F-1 CFPA. The CFPA has been tested successfully and a rebuild due to the above listed discrepancies is not deemed cost or schedule effective.

RE [signature] 3/4/82

QA [signature] 3-4-82

REA D.M. Randall 3/4/82 SYS ENGR [signature] PE [signature] 3/4/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 003 51065 SN 003 ONLY

CMO [signature] 3-8-82

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE | TITLE

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. [signature] DATE: 3/9/82

DD FORM 1694

ORIGINAL PAGE IS
OF POOR QUALITY

Attachment to Request for Deviation/Waiver No. W-142

1. Assembly Planning (AHR) was issued for use in the fall of 1978. Investigation which was performed on the Protoflight Model, which had the same problem, was accepted, however, there appears to be no documentation to support this investigation.

2. Depositions were performed per standard procedures (hand-written) with the AHR defining the amount to be evaporated, during 1978 - 1980 period. However, the evaporation lab utilizes Laboratory Procedure Instruction (LPI) which are now being changed to Manufacturing Production Engineering Instructions (MPEI). MPEI's are being released through Production Engineering under W.G. Speth.

3. Resistance Measurements recorded on attached AHR data sheet do not meet requirements specified on drawing Note 15 which says that: "Pad to Pad resistance of traces shall not exceed 3.0 ohms." The resistance of the traces is minimal and will not have a measurable affect on the detector performance. This variation is inherent in chemical evaporation processing. See Table below for actual readings.

Measurement Point to Point	Specification	Before Temp Cycle	After Temp Cycle
Hg Cd te 5-3(-)	<3 ohms	1.8	1.7
5-3(+)	"	3.4 (OT)	2.7
5-4 -	"	4.3 (OT)	3.7 (OT)
5-4(+)	"	5.1 (OT)	4.7 (OT)
5-2(-)	"	5.0 (OT)	5.0 (OT)
5-2(+)	"	4.5 (OT)	3.8 (OT)
5-1(-)	"	3.4 (OT)	2.7
5-1(+)	"	1.8	1.7
T, Top (-)	"	2.8	2.7

OT - Out of Tolerance

4. Deposition thickness was not recorded at operation 3150. In reviewing previous history the run number 1984 which was the same for the Protoflight substrate used indicates that the lab log book for Run number 1984 recorded a thickness of 2000 angstroms on October 8, 1978.

ORIGINAL PAGE IS ~~OF POOR QUALITY~~ EPA

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 41381

SHEET 1 OF 4

DRAWING TITLE	DRAWING NUMBER
TEST PROCEDURE - TM CFPA	16192-E

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
V411 FL 1162	REWORK ☐ ITEMS CONFORM ☒ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	☐ I ☒ II A	☐ A ☒ B
EFFECTIVITY 51015 SN 003 & 33BG		AUTHORIZING ICR NUMBER TM2641/01	

DESCRIPTION OF CHANGE

SECTION 4.13

Add after the section title

NOTE

During tests which use a blackbody source the CFPA dewar window shall be apertured with tape or a suitable mask. (approximately 3/8" square)

Delete and add within the second paragraph of the section

Delete: "Decade box ... required gain resistor. Record ... on test sheet 10."

Replace with: RECOMMENDED PROCEDURE

A decade resistor box or adjustable resistor may be used to determine the required resistors. At the option of the test engineer the following procedure may be employed for Bands 5 and 7. Using the selective voltmeter measure and record the output of each channel. Select any channel to be the nominal or reference channel. For each of the other channels form the ratio, r, as follows:

$$r = \frac{\text{Output of reference channel}}{\text{Output of channel n}}$$

Then calculate the value of the post gain resistor from

$$R_{\text{POST GAIN}} = \frac{(r)(40)(G_{NOM})}{1 - (3)(r)(G_{NOM})}$$ (in Kohms)

* NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION

PREPARED BY	DATE	QUALITY APPROVAL	DATE	REVISION STATUS THIS PRINT	DATE
N. J. DAVISON, III	FEB. 15, 1982	[illegible]			
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
[illegible]	FEB. 15, 1982			[illegible]	
RRA/RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[illegible]	[illegible]	[illegible]	[illegible]		

ORIGINAL PAGE IS
OF POOR QUALITY

TEST SHEET 14

Sheet 1 of 1

SHIELD ISOLATION TEST

Assembly 50973 S/N 201

Date FEB. 12, 1982

CABLES	RESISTANCE BETWEEN FPW SHIELDS
5-6	>20M
6-7	>20M
7-5	>2M
5-H/S	>20M
6-H/S	>20M
7-H/S	>20M

Limit >1 Megohm

Test Engineer N. C. DAVISON, III Date FEB. 12, 1982

Test Supervisor [signature] III Date FEB. 12, 1982

Quality Assurance [signature] Date FEB 12, 1982

SEE ALSO RESISTANCE MATRIX IN 50973
TEST AHR FLIGHT S/N 201 COMMENT SHEET 8.
NCD III
FEB. 23, 1982

SIZE	CODE IDENT NO	NUMBER
A	11323	16192
SCALE	REV	SHEET

FORM NO 3122 · A · 3 · 81 DIETERICH POST CLEARPRINT ·COUN

IT 50973		PART NAME F-1 CFPA	ASSY/LOT SERIAL NO. 201	QTY
DATE	OPERATOR OR INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL
FEB. 12 1982	NCD III (178)	1. PERFORM CONTINUITY CHECK BETWEEN		
		THE FOLLOWING POINTS:		
		a. DEWAR TO H/S SHIELD >20M		
		b. DEWAR TO B/5 SHIELD >20M		
		c. DEWAR TO B/7 SHIELD >2.0M C.E.O.		
		d. DEWAR TO B/6 SHIELD >20M		
		e. B/5: >7M B/7 >20M H/S >20M B/6		
		f. B/7: >2M B/5 >20M H/S >20M B/6		
		g. H/S: >20 B/5 >20 B/7 >20 B/6	ORIGINAL PAGE IS OF POOR QUALITY	
		h. B/6: >20 B/5 >20 B/7 >20 H/S		
		#8		

ORIGINAL PAGE IS
OF POOR QUALITY

BAND 5
RADIOMATRIC

TEST SHEET 12
SHEET 1 OF 3

SIGNAL/NOISE

CFPA SERNO 201 BAND 5 PREAMP SERNO 201 DATE: FEB. 19, 1982

BAND 5 POST AMP SERNO 201

T1 READING .976 VOLTS= 91.0 °K

TEST ENGINEER

T2 READING .976 VOLTS= 91.0 °K

W. C. DAVISON, III

	2mV	500mV	500mV	100mV	20mV	20mV			
SCOPE GAIN ==	X245	X980	X980	X4.9	X24.5	X245			
CHANNEL	PREAMP OUTPUT			POST AMP OUTPUT			CALCULATIONS		POST AMP. GAIN
	@ ≈ 1KHZ		BROAD BAND NOISE	@ ≈ 1KHz		BROAD BAND NOISE	MAX $\le 5.8\times10^{-12}$ NEP λ	MIN ≥ 8 A/W Rλ	
	SIGNAL	NOISE		SIGNAL	NOISE				
1	456 mV	1.49 mV/√Hz	.40 V	215 mV	854 μV/√Hz	.58 V	3.1×10^{-12}	1.4	23.6
2	447	1.37	.38 V	214	824	.55 V	2.9	1.4	23.9
3	459	1.46	.52 V	219	915	.65 V	3.4	1.4	23.9
4	470	1.22	.39 V	215	763	.63 V	3.4	1.5	22.9
5	454	1.49	.39 V	216	854	.58 V	3.1	1.4	23.7
6	476	1.46	.40 V	219	763	.60 V	3.1	1.5	23.0
7	456	1.43	.38 V	215	824	.63 V	3.4	1.4	23.5
8	458	1.49	.40 V	218	854	.58 V	3.0	1.4	23.8
9	425	1.40	.41 V	217	915	.60 V	3.2	1.3	23.5
10	431	1.53	.55 V	219	946	.97 V	5.1	1.3	25.4
11	448	1.43	.39 V	222	824	.64 V	3.3	1.4	24.8
12	444	1.49	.42 V	222	854	.72 V	3.7	1.4	25.0
13	439	1.46	.41 V	219	824	.69 V	3.6	1.4	24.9
14	441	1.40	.38 V	222	824	.60 V	3.1	1.4	25.2
15	451	1.49	.46 V	218	824	.60 V	3.2	1.4	24.1
16	455 mV	1.37 mV/√Hz	.38 V	218 mV	915 μV/√Hz	.60 V	3.2	1.4	24.0

POST AMP GAIN SEE ABOVE
APERTURE TO FILTER= 18.1 cm
DETECTOR AREA= 2.845×10^{-5} cm^2
H_0^∞ = 3.4×10^{-5} W/cm^2
BLACKBODY TO λ= 169
BLACKBODY TEMPERATURE= 800 K
DESIGN ENGINEER W. C. Davison III

FEEDBACK RESISTOR= 2.3×10^{8} Ω
NOISE CORRECTION FACTOR 1.0
BANDWIDTH= 52 KHz
APERTURE DIAMETER= .257 cm
SCOPE GAIN SEE ABOVE
Q.A. ENGINEER ACCEPT 118 2/22/82

SIZE	CODE IDENT NO	NUMBER
A	11323	16192

ORIGINAL PAGE IS
OF POOR QUALITY

PER TEST AHR. 50973
OPERATION 2500

BAND 5
RADIOMATRIC

TEST SHEET 12
SHEET 1 OF 3

SIGNAL/NOISE

FEB-16-1982

CFPA SERNO 201 BAND 5 PREAMP SERNO 201 DATE: 02-17-82

BAND 5 POST AMP SERNO 201

T1 READING .976 VOLTS= 91 °K

T2 READING .976 VOLTS= 91 °K

\# BW.
\# =10HZ

TEST ENGINEER N.C. DAVISON, III
C. R. Lane

SCOPE GAIN	2mV X245	500mV/div mV/√Hz	500µV X980	100mV X4.9	20mV/div µV/√Hz	20mV X24.5	#@ 50mV/div (.95 @ 20mV/div)		
CHANNEL	PREAMP OUTPUT @ ≈ 1KHZ SIGNAL	PREAMP OUTPUT @ ≈ 1KHZ NOISE#	PREAMP OUTPUT BROAD BAND NOISE	POST AMP OUTPUT @ ≈ 1KHz SIGNAL	POST AMP OUTPUT @ ≈ 1KHz NOISE#	POST AMP OUTPUT BROAD BAND NOISE	CALCULATIONS MAX $\leq 5.8\times10^{-12}$ NEP λ	CALCULATIONS MIN ≥.8 A/W Rλ	POST AMP. GAIN
1	461 mV	1.59 mV/√Hz	.42 V	216 mV	824 µV/√Hz	.58 V	3.1×10^{-12}	1.4	23.3
2	450	1.19	.39	215	763	.55	2.9	1.4	23.7
3	459	1.65	.52	219	732	.65	3.4	1.4	23.7
4	.471	1.28	.41	215	732	.65	3.5	1.5	22.7
5	457	1.28	.40	216	732	.59	3.1	1.4	23.5
6	478	1.40	.41	219	763	.60	3.1	1.5	22.8
7	463	1.40	.40	217	946	.64	3.4	1.4	23.3
8	464	1.46	.40	218	915	.59	3.1	1.4	23.3
9	428	1.22	.42	217	1.01 mV	.60	3.2	1.3	25.2
10	434	1.40	.56	216	732	.38#	5.0	1.4	24.7
11	442	1.37	.41	220	854	.63	3.3	1.4	24.7
12	438	1.28	.43	220	946	.72	3.7	1.4	25.0
13	436	1.28	.41	219	1.04 mV	.69	3.6	1.4	25.0
14	436	1.22	.39	219	824	.60	3.1	1.4	25.0
15	452	1.59	.47	217	824	.61	3.2	1.4	23.8
16	455 mV	1.22	.39 V	218 mV	824 µV/√Hz	.60 V	3.2	1.4	23.8

POST AMP GAIN - SEE ABOVE
APERTURE TO FILTER= ~~18.4 cm~~ 18.1 cm
DETECTOR AREA= 2.845×10^{-5} cm^2
H_0^∞ = 3.7×10^{-5} W/cm^2
BLACKBODY TO λ= 169
BLACKBODY TEMPERATURE= 800K

FEEDBACK RESISTOR= 2.3×10^{8} Ω
NOISE CORRECTION FACTOR 1.0
BANDWIDTH= 52KHZ
APERTURE DIAMETER= ~~.254~~ .257 cm (.101 in)
SCOPE GAIN SEE ABOVE
Q.A. ENGINEER P.D. Ryan

DESIGN ENGINEER N.C. Davison III

ACCEPT 118 2/18/82

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
	SCALE	REV	SHEET 42

PER 16192 PARAGRAPH 4.11

ORIGINAL PAGE IS OF POOR QUALITY

TEST SHEET 8

FREQUENCY RESPONSE CFPA / PREAMP

DATE: FEB. 10, 1982

CFPA SERNO 201 BAND 5 SERNO 201 BAND 7 SERNO 201

T1 READING .976 VOLTS= 91.0 °K

TEST ENGINEER

T2 READING .976 VOLTS= 91.0 °K

N. C. DAVISON, III

+15VDC .075 Amps MILLIAMPS (80mA MAX), -15VDC .075 Amps MILLIAMPS (80mA MAX)

	BAND 5			BAND 7		
CHANNEL	500 Hz (mV)	3db POINT 5KHz ± 2KHz	SLOPE	500 Hz (mV)	3db POINT 5KHz ± 2KHz	6 ± 2db SLOPE
1	0 dB	8.5 KHz	-6 dB/oct	0 dB	7.9 KHz	-6 dB/oct
2	0 dB	9.1	-6	0 dB	8.1 KHz	-5.25
3	0 dB	8.5	-6	0 dB	7.5 KHz	-6
4	0 dB	7.0+	-6	0 dB	8.3 KHz	-6
5	0 dB	8.0	-6	0 dB	8.2 KHz	-6
6	0 dB	7.9	-6	0 dB	8.2 KHz	-6
7	0 dB	7.0+	-6	0 dB	8.1 KHz	-6
8	0 dB	8.2	-6	0 dB	6.4 KHz	-6
9	0 dB	10	-6	0 dB	8.4 KHz	-6
10	0 dB	8.6	-6	0 dB	7.2 KHz	-6
11	0 dB	7.7	-6	0 dB	7.4 KHz	-6
12	0 dB	8.4	-6	0 dB	7.0 KHz	-6
13	0 dB	9.0	-6	0 dB	8.4 KHz	~~-5.25~~ -6
14	0 dB	8.7	-6	0 dB	6.9 KHz	~~-6~~ -5.25
15	0 dB	8.0	-6	0 dB	7.6 KHz	-6
16	0 dB	8.5 KHz	-6	0 dB	8.4 KHz	-6

EQUIPMENT USED: MODEL SERNO CAL DUE DATE

1)
2) BAND 5 REF. CH.'S 1-16
3) BAND 7 REF. CH. 1-7 & ~~9~~-13; 15 & 16 } See E.O. 4156A
4)
5)
6)
7)
8)

DESIGN ENGINEER Harold C. Davison III

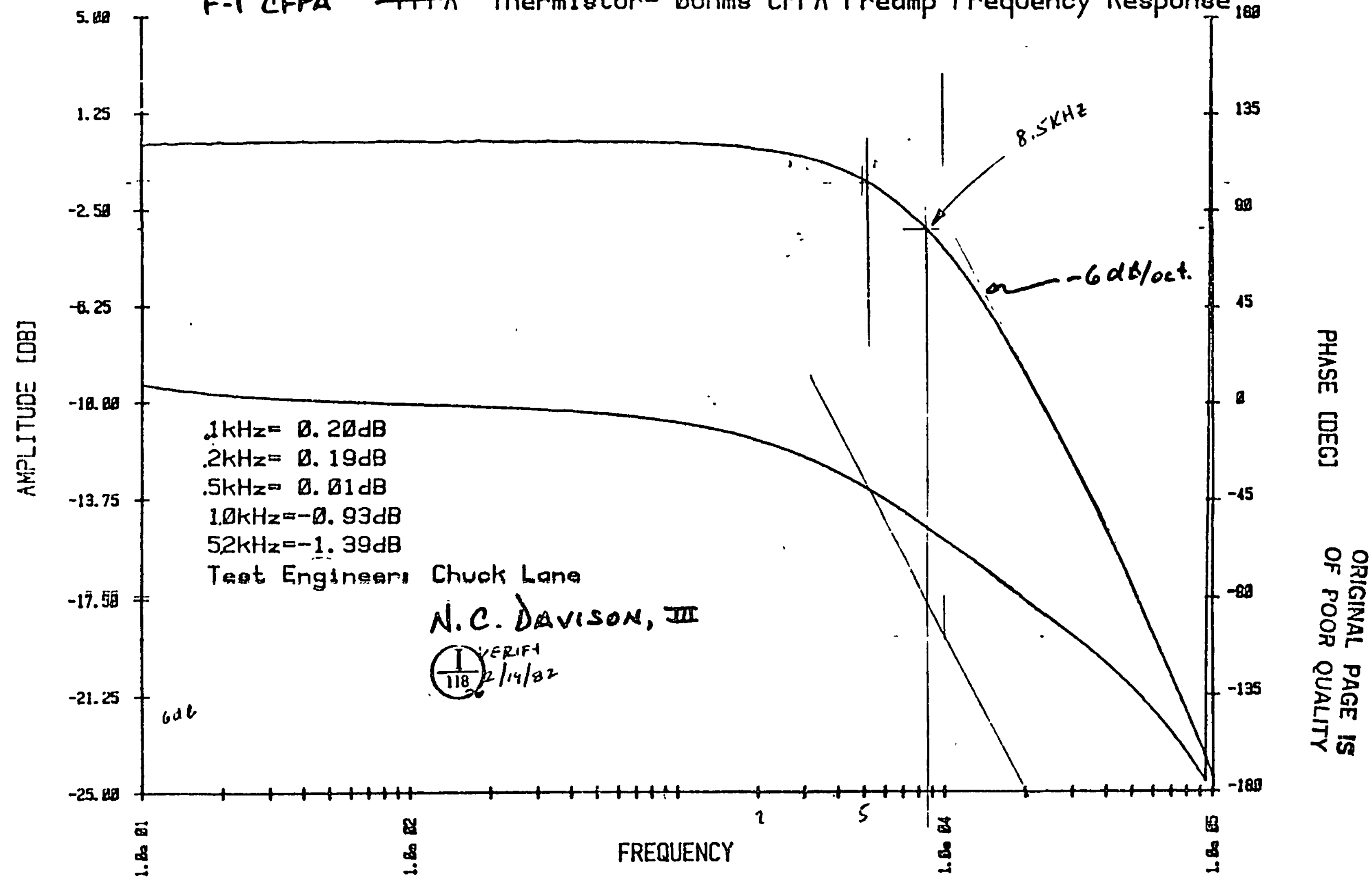
ALL CHANNELS EXCEPT BAND 7, CH 8 AND 14 OUT OF SPEC ON 3dB POINT 2/22/82 [illegible] 9203

TITLE

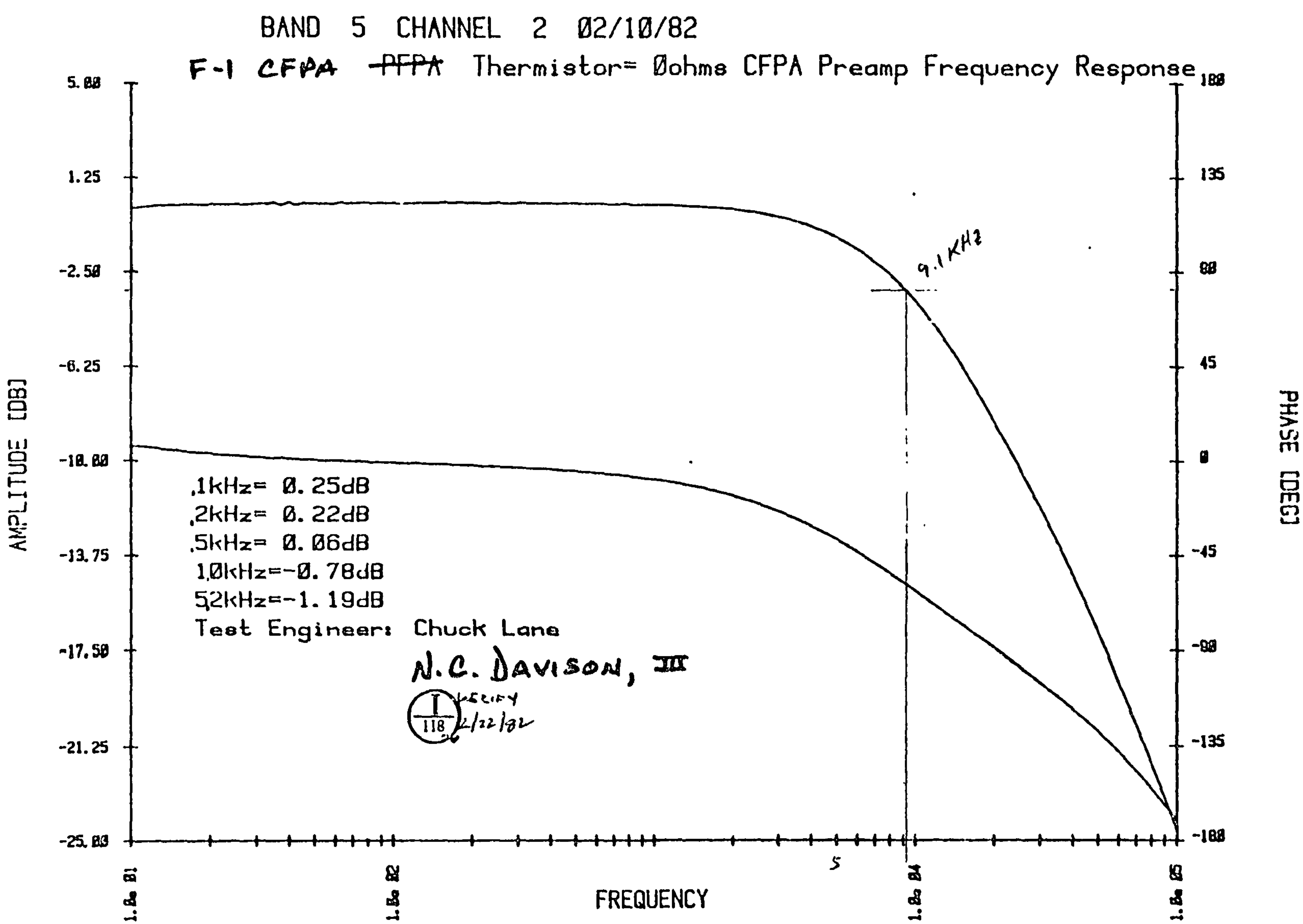
SIZE	CODE IDENT NO	NUMBER
A	11323	16192
SCALE	REV	SHEET

BAND 5 CHANNEL 1 02/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response

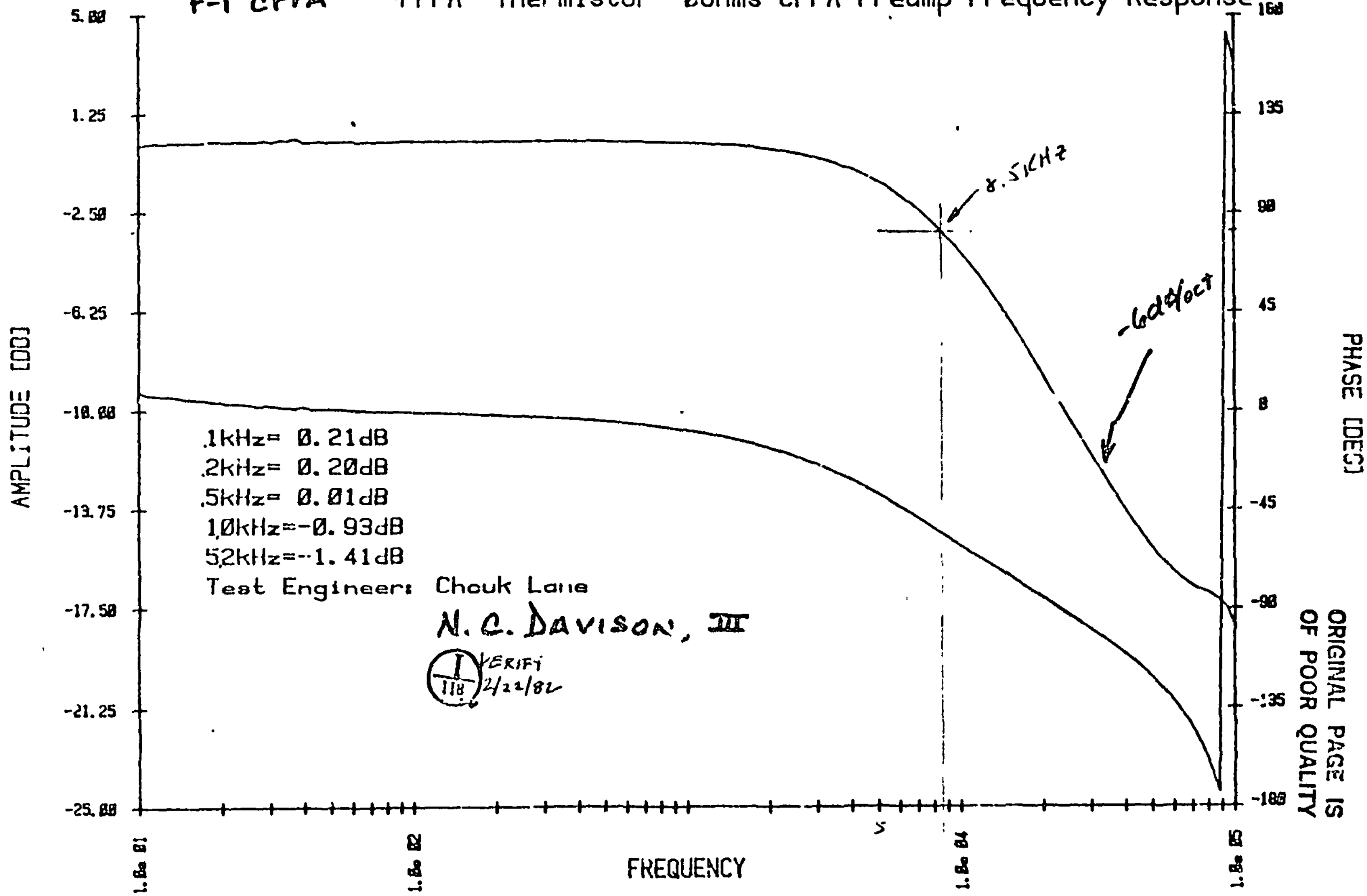


ORIGINAL PAGE IS OF POOR QUALITY


BAND 5 CHANNEL 2 02/10/82
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Frequency Response
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
FREQUENCY
1.0e 01
1.0e 02
5
1.0e 04
1.0e 05
9.1KHz
.1kHz= 0.25dB
.2kHz= 0.22dB
.5kHz= 0.06dB
10kHz=-0.78dB
52kHz=-1.19dB
Test Engineer: Chuck Lane
N.C. DAVISON, III
I
118
2/22/82

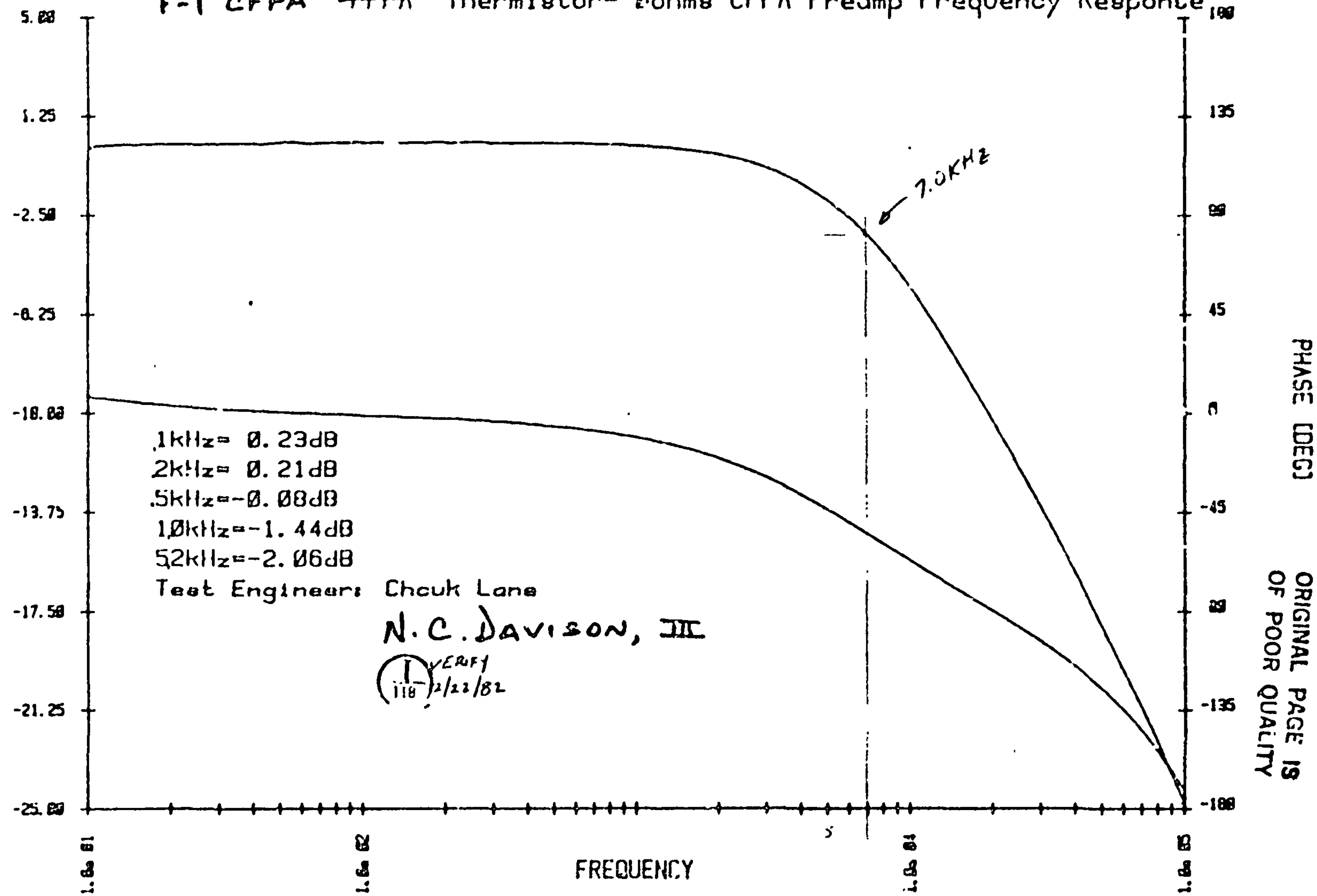
BAND 5 CHANNEL 3 02/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



BAND 5 CHANNEL 4 02/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Responce



.1kHz= 0.23dB
.2kHz= 0.21dB
.5kHz=-0.08dB
10kHz=-1.44dB
52kHz=-2.06dB
Test Engineer: Chuck Lane

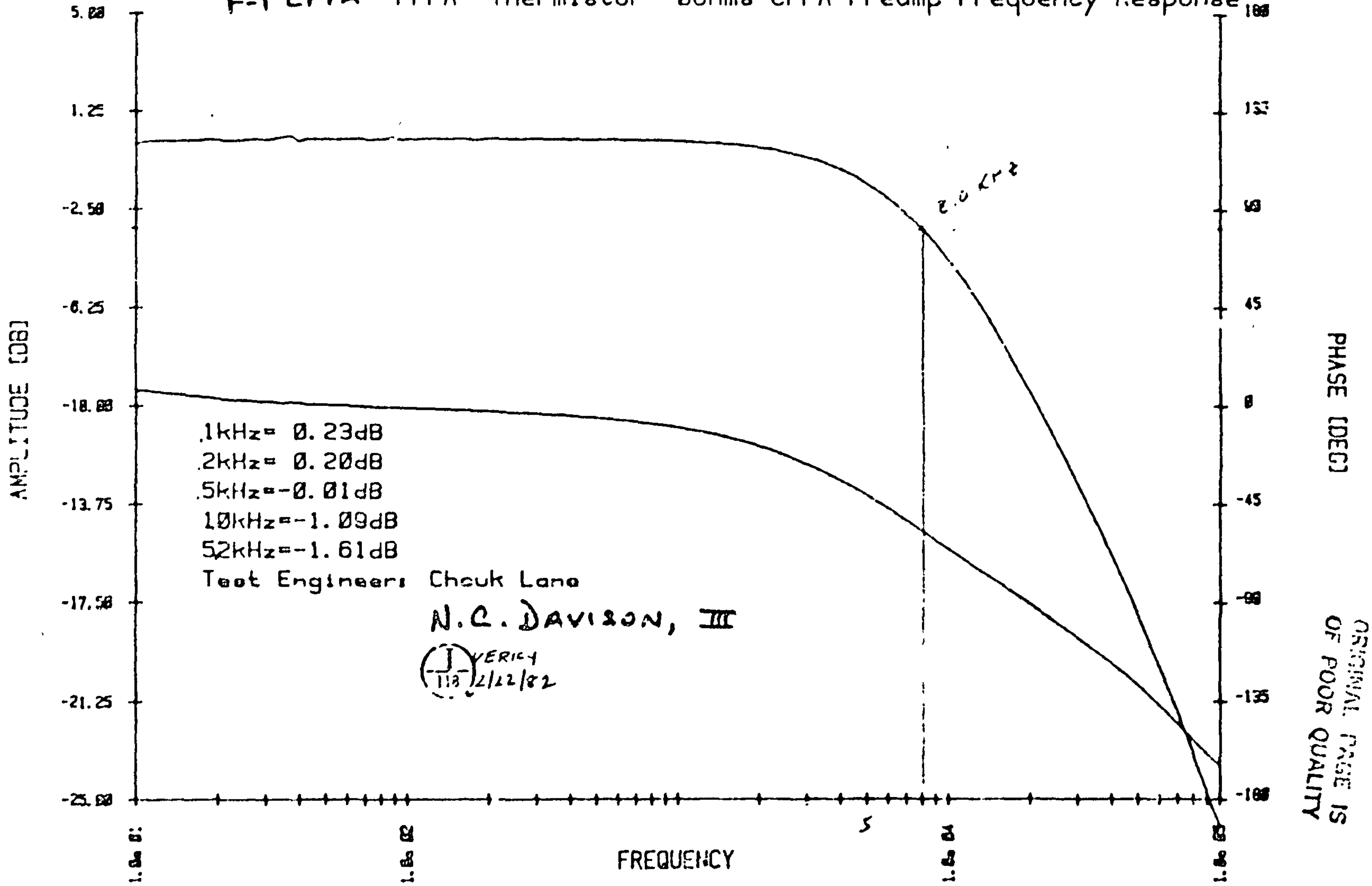
N.C. DAVISON, III

VERIFY 2/22/82

ORIGINAL PAGE IS OF POOR QUALITY

BAND 5 CHANNEL 5 02/10/82

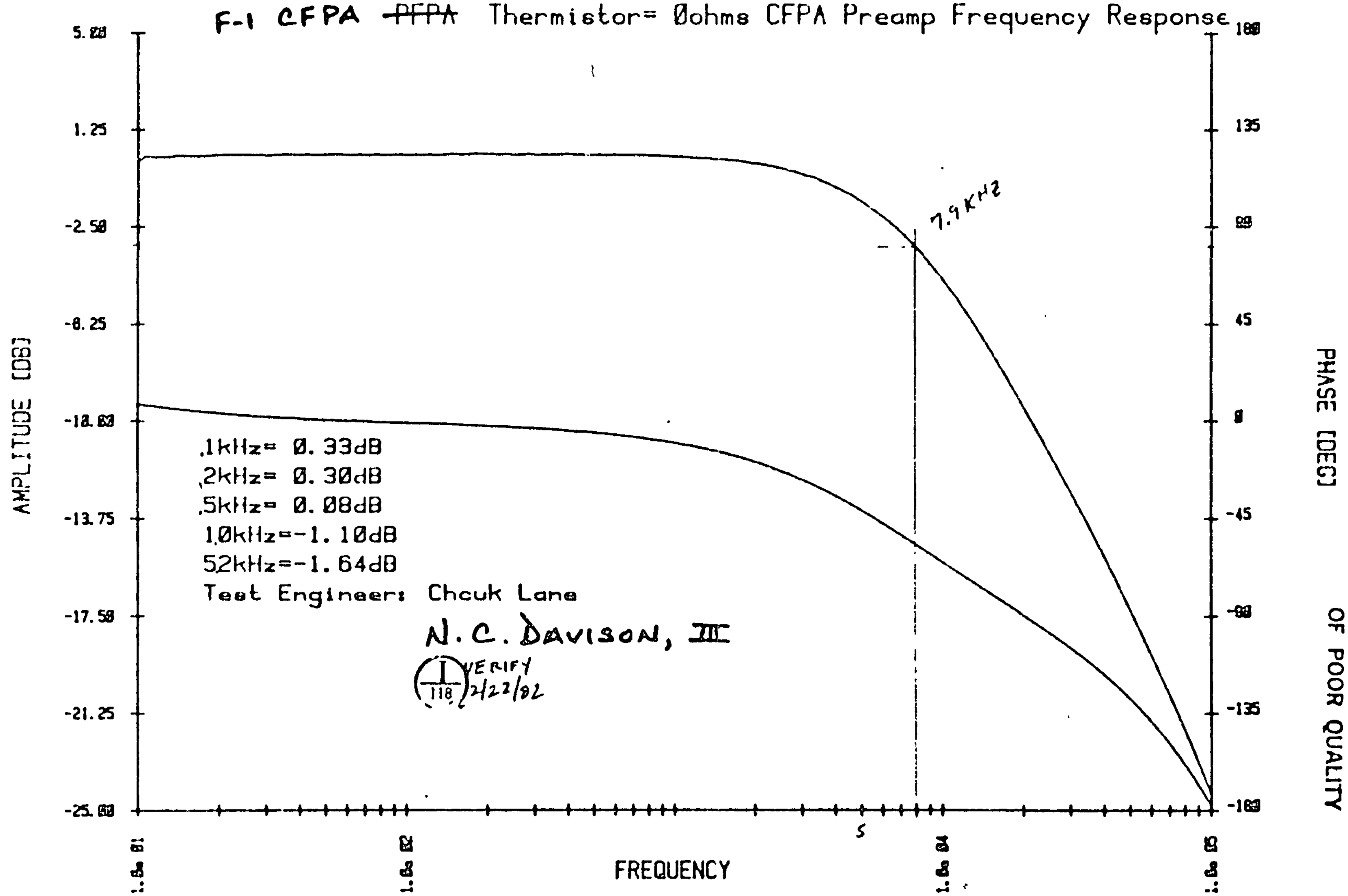
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



ORIGINAL PAGE IS OF POOR QUALITY

BAND 5 CHANNEL 6 02/10/82

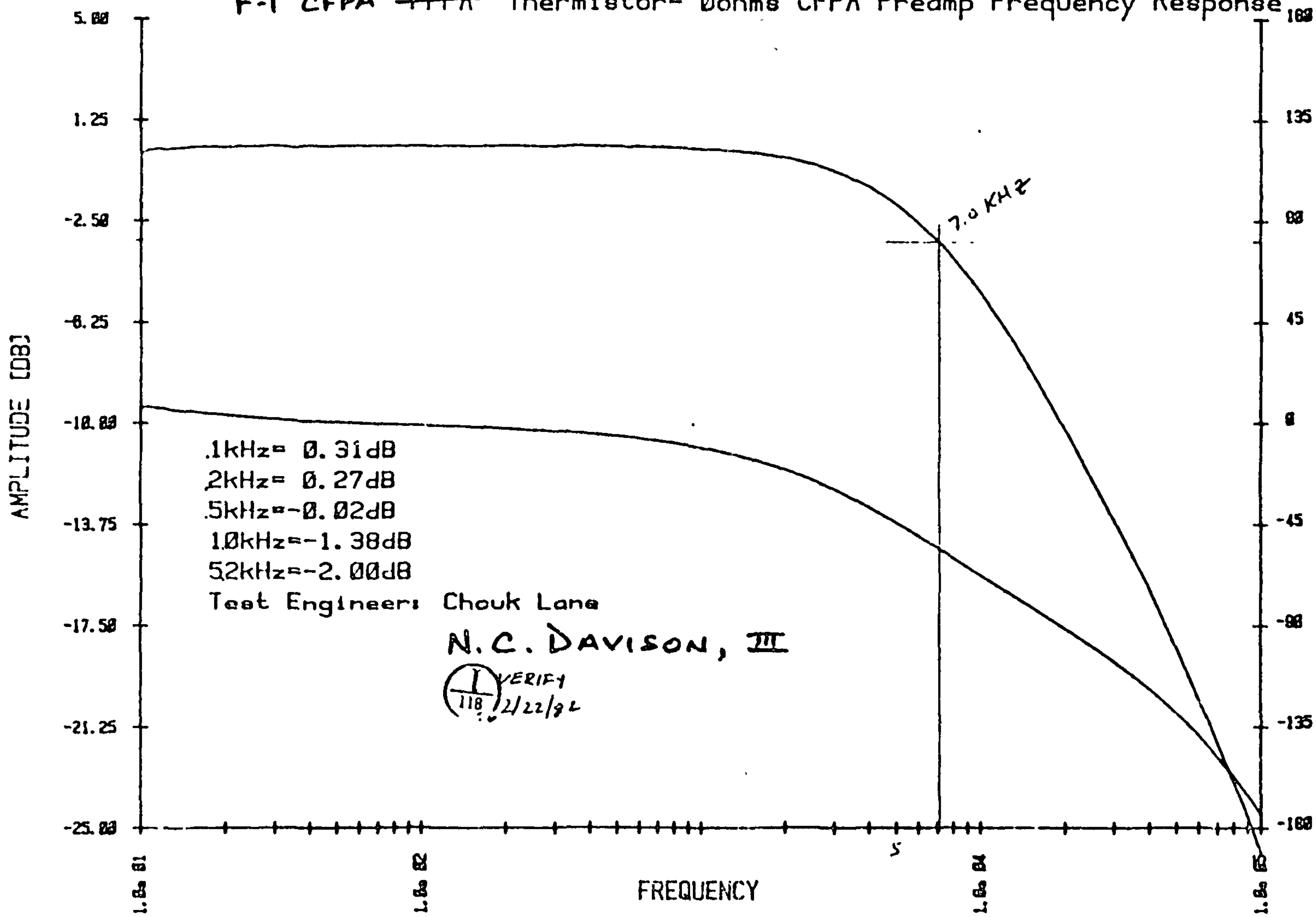
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Frequency Response



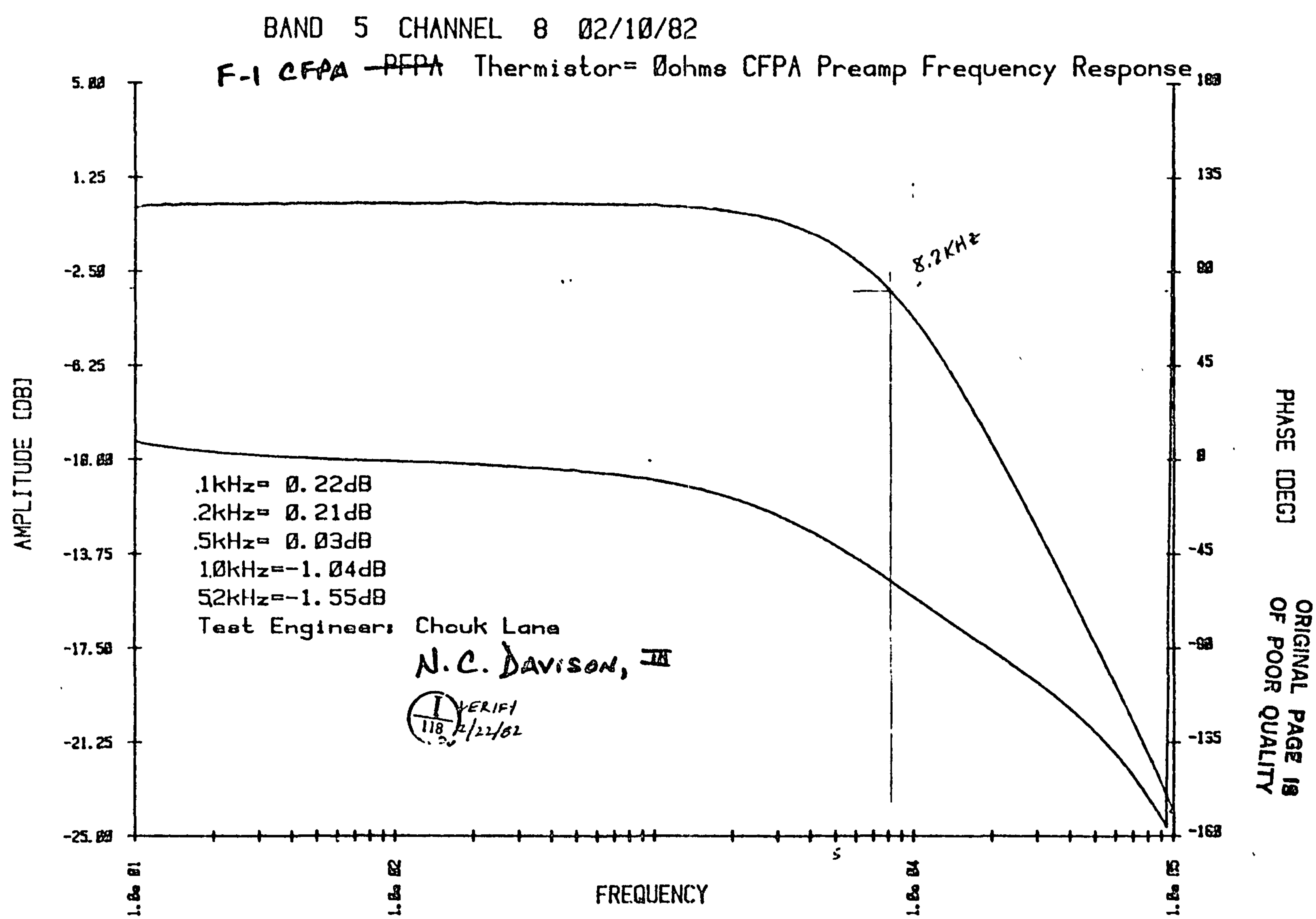
ORIGINAL PAGE IS
OF POOR QUALITY

BAND 5 CHANNEL 7 02/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



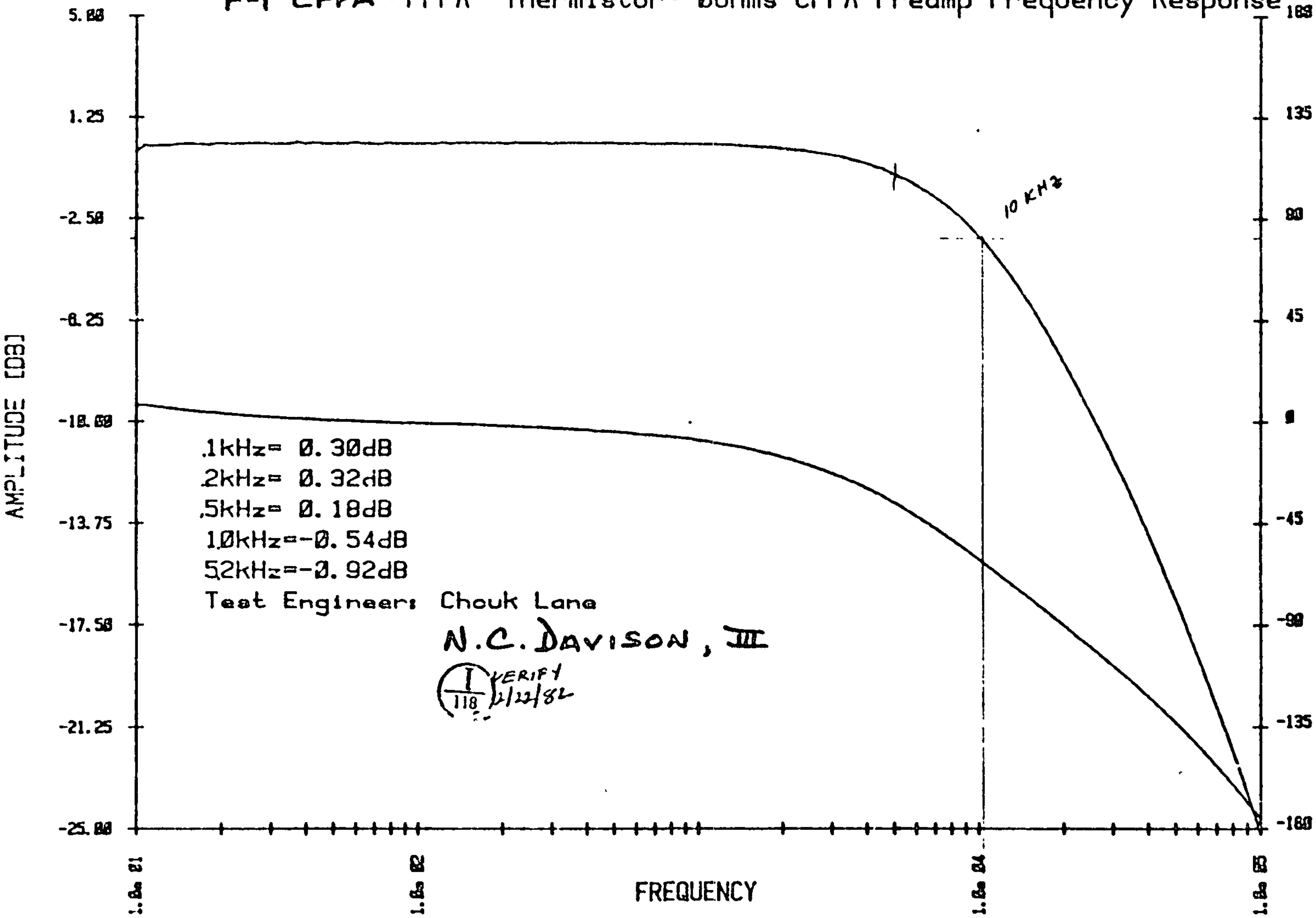
ORIGINAL PAGE IS OF POOR QUALITY



ORIGINAL PAGE IS OF POOR QUALITY

BAND 5 CHANNEL 9 02/10/82

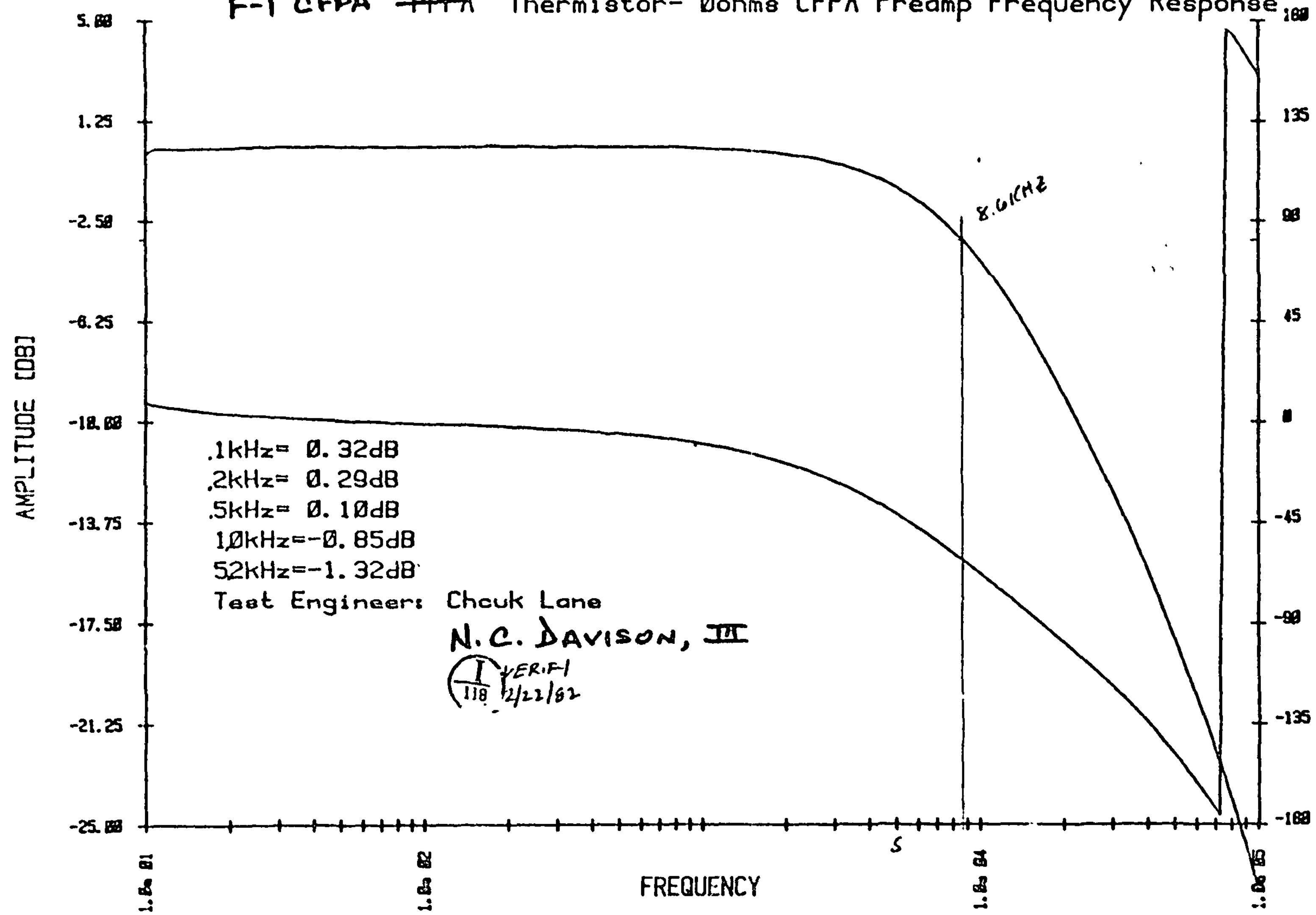
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

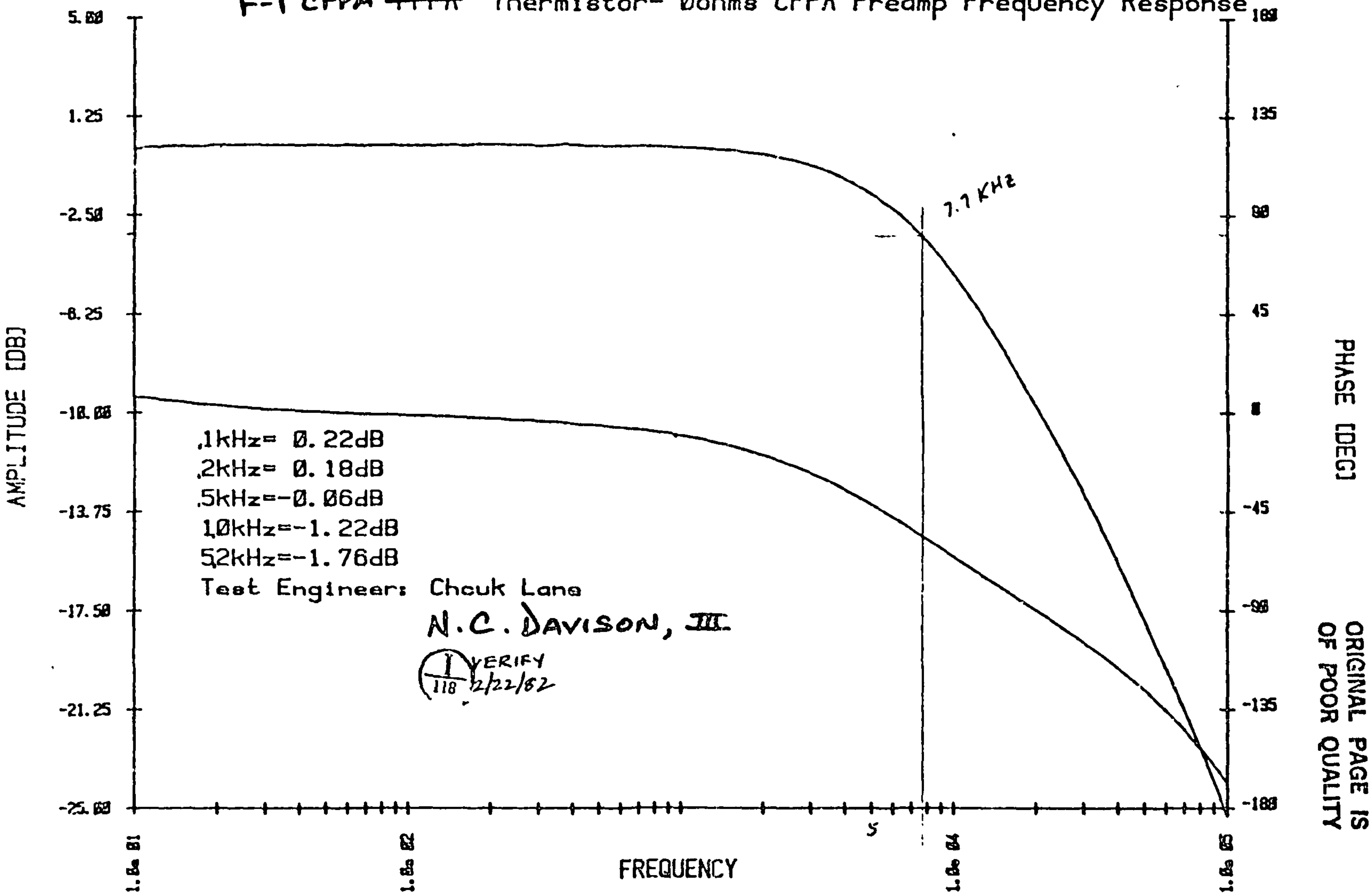
BAND 5 CHANNEL 10 02/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



BAND 5 CHANNEL 11 02/10/82

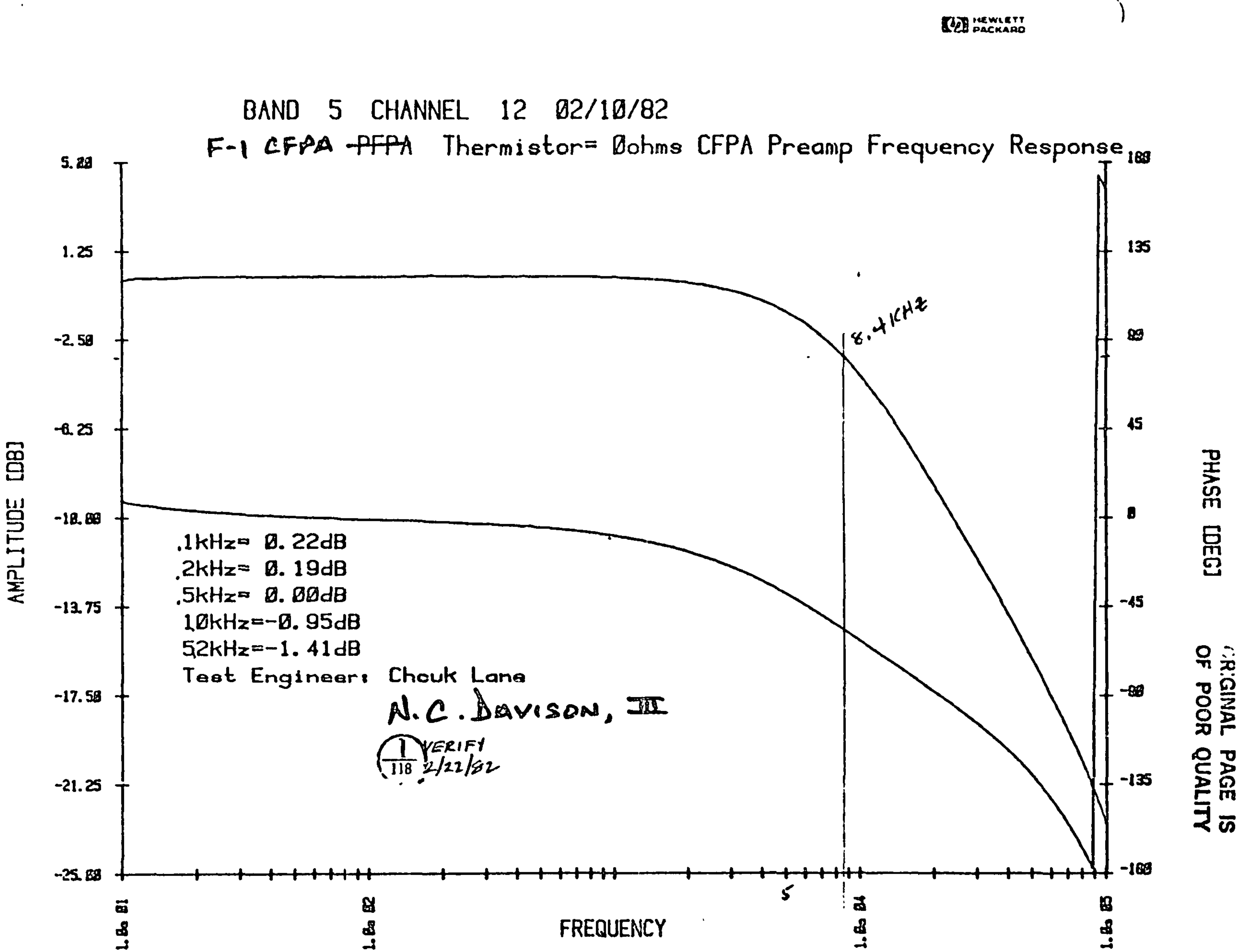
F-1 CFPA ~~F1PA~~ Thermistor= Øohms CFPA Preamp Frequency Response



ORIGINAL PAGE IS OF POOR QUALITY

BAND 5 CHANNEL 12 02/10/82

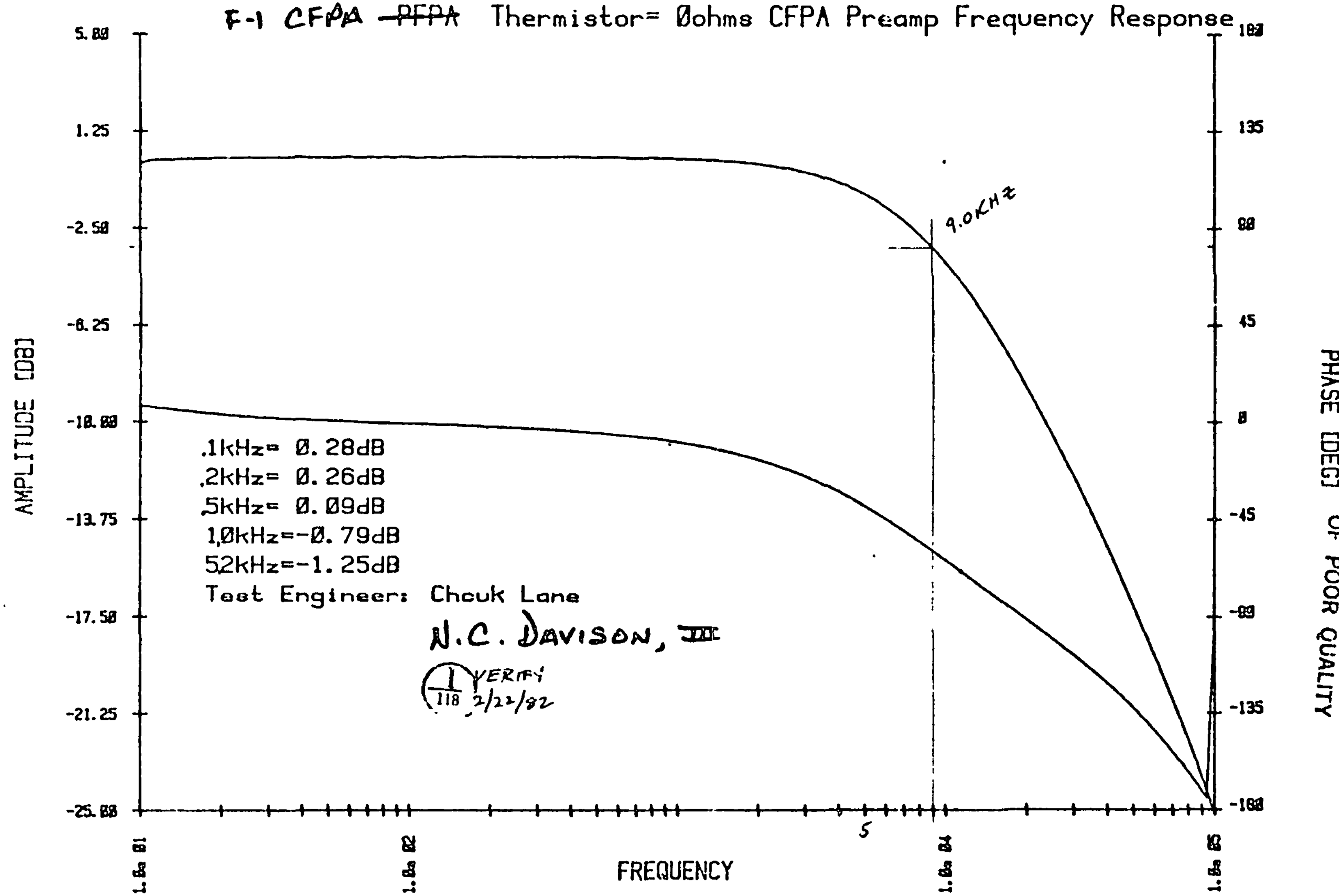
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

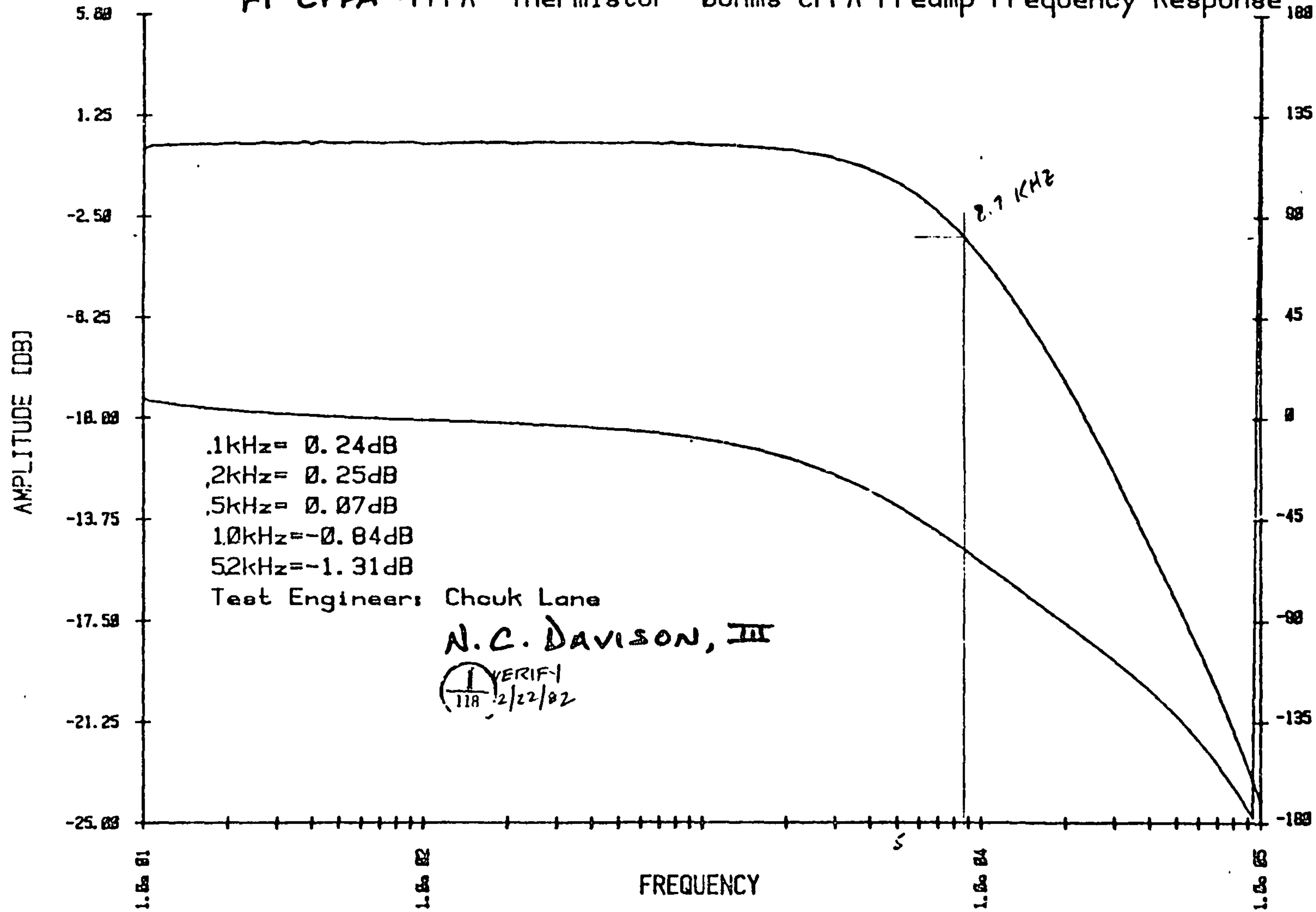
BAND 5 CHANNEL 13 02/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Frequency Response



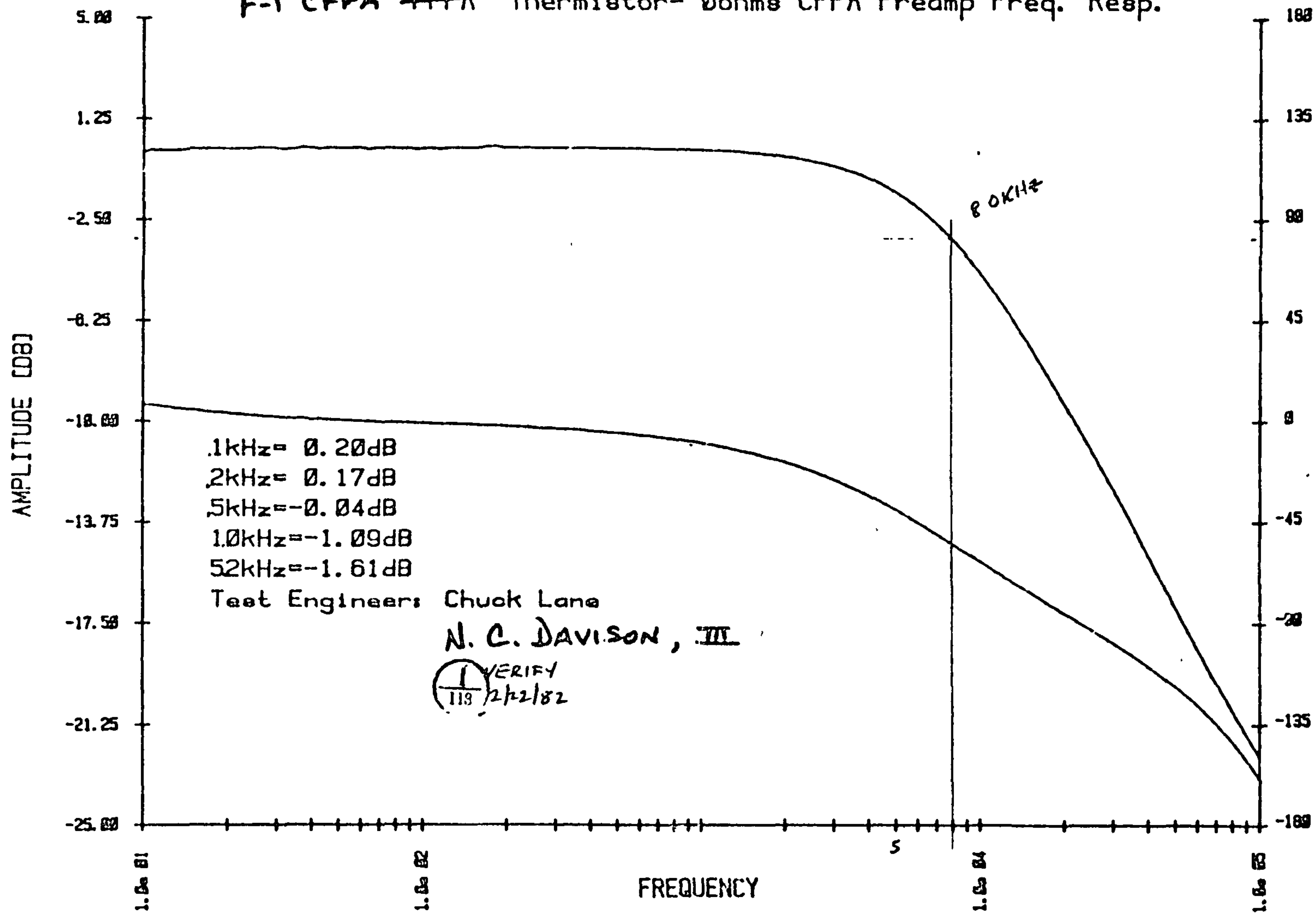
BAND 5 CHANNEL 14 02/10/82

FI CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Frequency Response



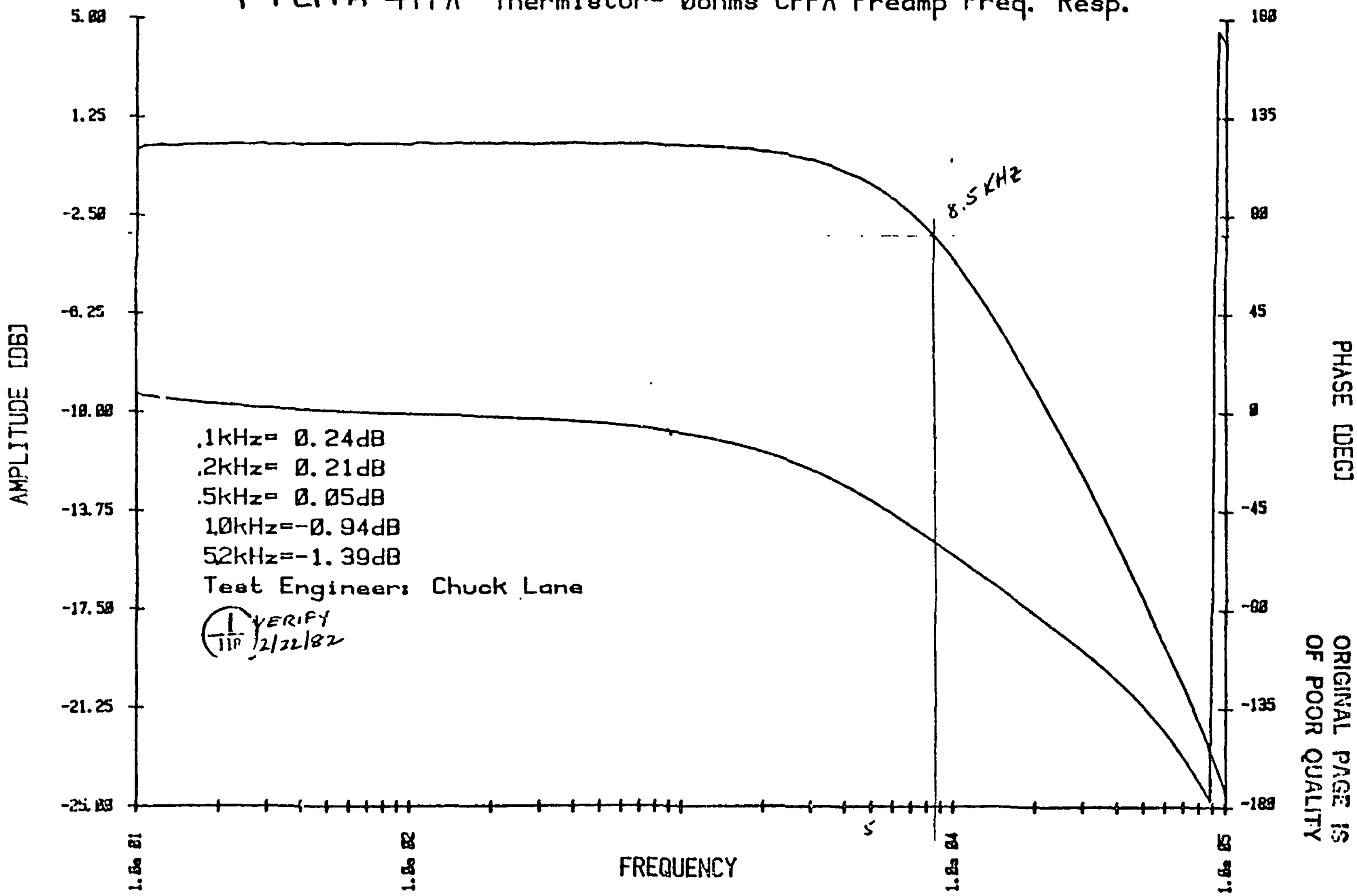
BAND 5 CHANNEL 15 Feb. 10, 1982

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq. Resp.



BAND 5 CHANNEL 16 Feb. 10, 1982

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq. Resp.



ORIGINAL PAGE IS OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

BOOSTED FREQUENCY AND TRANSIENT RESPONSE BAND 5

DATE 02-10-82

CFPA SERNO 201

BAND 5 PREAMP NO. 50988 S/N 201 BAND 5 POSTAMP NO. 50908-1 S/N 201

T1 READING .974 VOLTS = 91.9 °K

T2 READING .974 VOLTS = 91.9 °K

TEST ENGINEER C. R. Lane

CURRENTS: +19VDC = .135 AMPS (150mA MAX) −19VDC = .140 AMPS (150mA MAX)

CHL	BOOST RESISTOR			ROLLOFF RESISTOR			TRANSIENT RESPONSE				BOOSTED	TIME DELAY (μS)	
	NO	OHMS (KΩ)	PART	NO	OHMS (KΩ)	PART	RISE-TIME	SETTLING TIMES 5%	1%	OVERSHOOT 10% MAX	52 KHz POINT	Leading	Trailing
1	R11			R53			11.0μS	.5%	.5%	7.2	−2.81 dB	12.2	13.1
2	R9			R73			12.0	.5	.3	7.5	−2.81 dB	12 μS	12.5 μS
3	R2			R58			11.5	1.5	.2	7.8	−2.61 dB	12.4	13.0
4	R10			R74			11.0	1.0	.5	10.4	−2.73 dB	12.0	12.6
5	R3			R57			11.0	1.0	.5	8.5	−2.94 dB	11.6	12.2
6	R1			R75			12.0	1.0	.2	10.8	−2.85 dB	12.6	13.1
7	R4			R56			12.5	1.0	.5	11.0	−2.94 dB	11.9	12.4
8	R12			R76			12.0	.8	.3	8.0	−2.98 dB	12.4	13.0
[illegible]	[illegible]			R55			12.5	1.5	.5	11.5	−2.94 dB	12.0	12.7
10	R13			R77			14.0	2.0	0.0	10.5	−3.19 dB	13.0	13.8
11	R3			R70			12.0	1.0	0.2	11.2	−2.64 dB	12.0	12.5
12	R14			R78			11.0	1.5	.5	10.8	−1.95 dB	12.2	12.[illegible]
13	R7			R71			11.5	1.0	.5	8.9	−2.79 dB	12.0	12.[illegible]
14	R15			R79			12.5	.5	.3	7.5	−2.93 dB	12.4	13.0
15	R8			R72			12.0	.2	.2	7.8	−2.61 dB	11.6	12.1
16	R5			R80			12.0	1.0	0.0	9.2	−2.65 dB	12.6	13.1

DESIGN ENGINEER Keith C. Davison III

EQUIPMENT USED

MODEL	SERNO	CAL DUE DATE
1) HP6255A Pwr. Supply.	GV-1416	03-05-82 (NCR)
2) 7603 "O" Scope	GS-11	03-03-82 (See Extension)
3) 7A22 PLUG-IN	GP-8	18 AUG-82
4) 7A18 PLUG-IN	GD-13	30 AUG 82
5) 7B53A PLUG-IN	GT-17	30 AUG 82
6) HP3570A NET. ANAL	G-457542	17 FEB 82
7) HP 3330B SYNTH.	G-457543	17 FEB 82
8) EGG 162 BoxCar Avg.	G-456989	27 AUG 82
9) 8012B PULSE GEN	GR-19	21 APR 82
10) 7225A PLOTTER	GX-21	02-18-82
11.) 7044A XY RECORDER	G-42	29 JUN 82

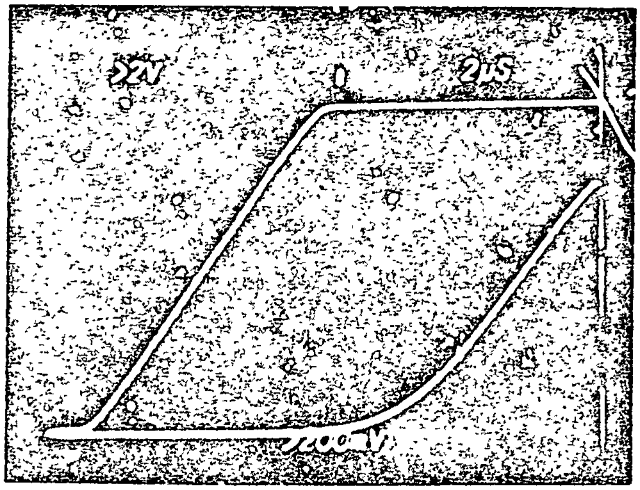
CH 10, 12 OUT OF SPEC AT 52 KHz. CH 4, 6, 7, 9, 10, 11, 12 OUT OF SPEC ON OVERSHOOT. CH 10 1.5% SETTLING POINT OUT OF SPEC ~~DELAY TIMES OUT OF SPEC FOR THE FOLLOWING CHANNELS: 1, 3, 4, 5, 8, ...~~

2/11/82 LEADING AND TRAILING DELAY TIME DIFFERENCES ARE BOTH OUT OF SPEC.

F/R 8208 BD

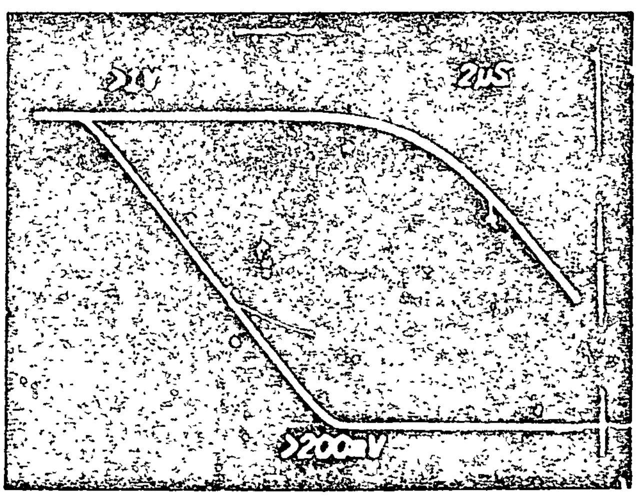
SIZE	CODE IDENT NO	NUMBER
A	11323	
SCALE	REV B	SHEET 37

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 1

DELAY TIME
12.2 μSec



BAND 5
CHANNEL 1

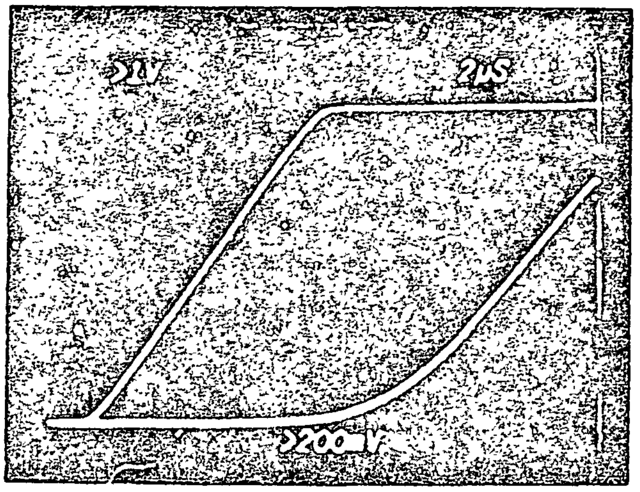
DELAY TIME
13.1 μSec

N.C. DAVISON

DATE: 02-10-82

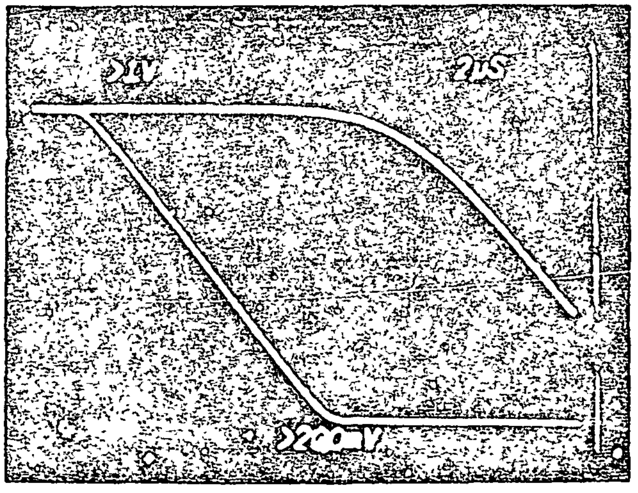
ECIF
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 2

DELAY TIME
12.0 µSec



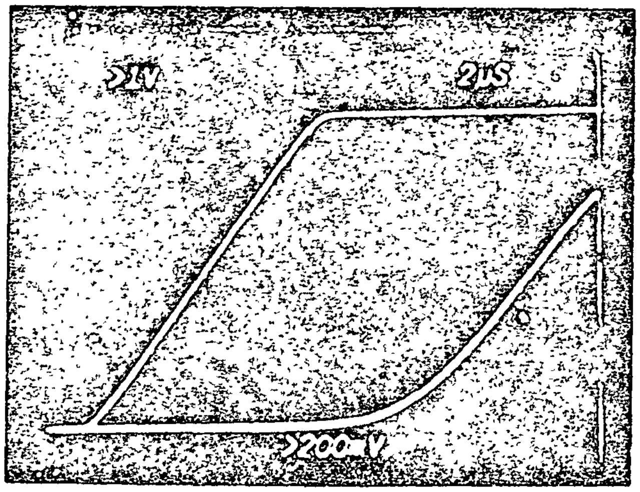
BAND 5
CHANNEL 2

DELAY TIME
12.5 µSec

N.C. DAVISON

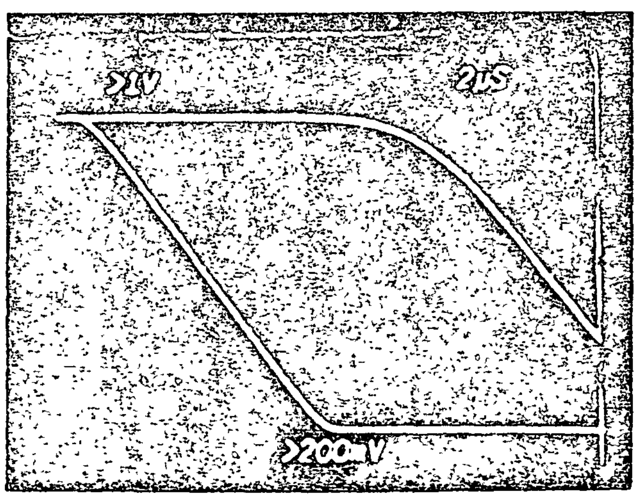
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 3

DELAY TIME
12.4 μSec



BAND 5
CHANNEL 3

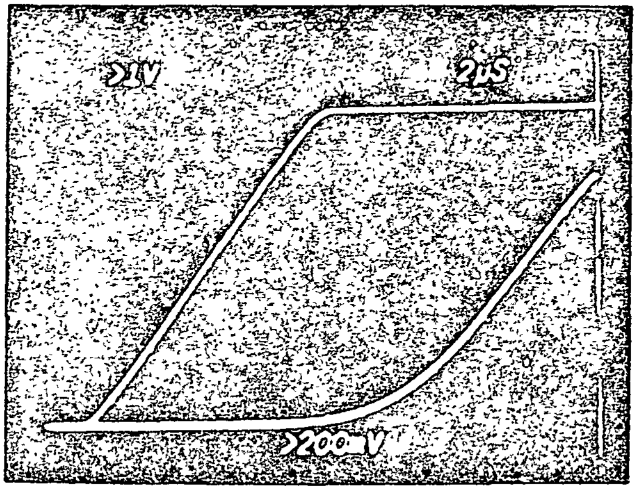
DELAY TIME
13 μSec

N. C. DAVISON

DATE: 02-10-82

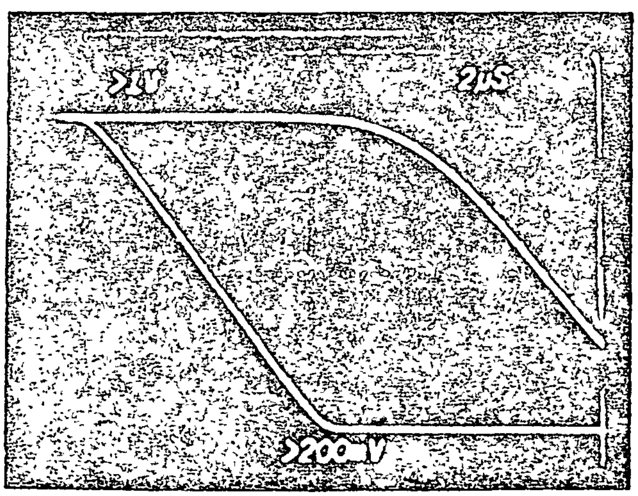
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 4

DELAY TIME
12.0 μSec



BAND 5
CHANNEL 4

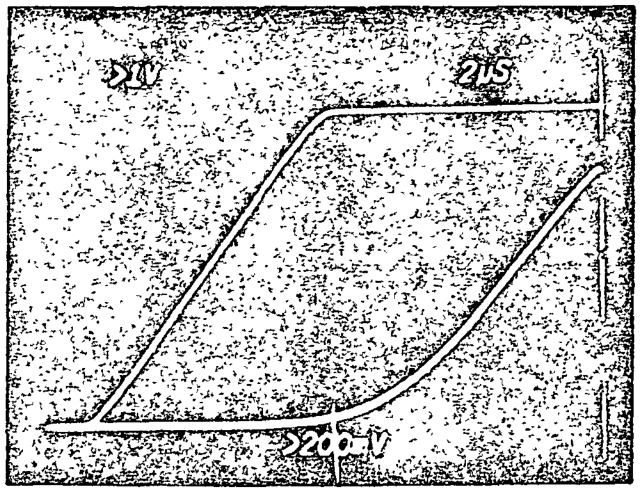
DELAY TIME
12.6 μSec

N.C. DAVISON

DATE: 02-10-82

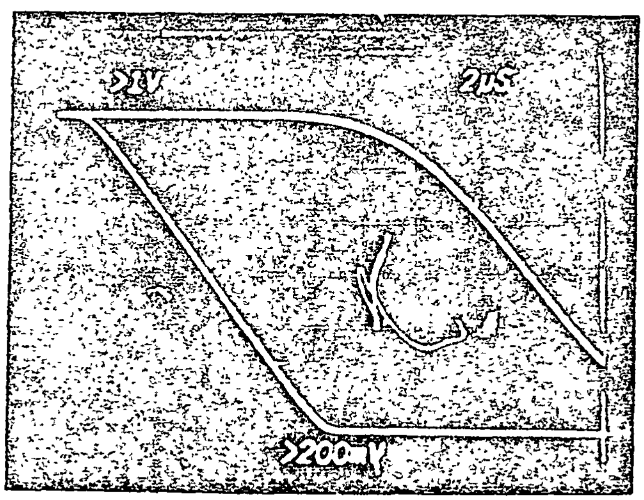
VERIFY
2-11-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 5

DELAY TIME
11.6 μSec



BAND 5
CHANNEL 5

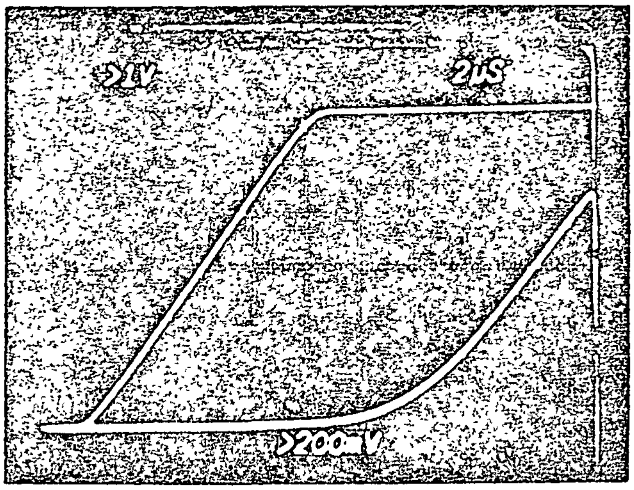
DELAY TIME
12.2 μSec

N. C. DAVISON

DATE: 02-10-82

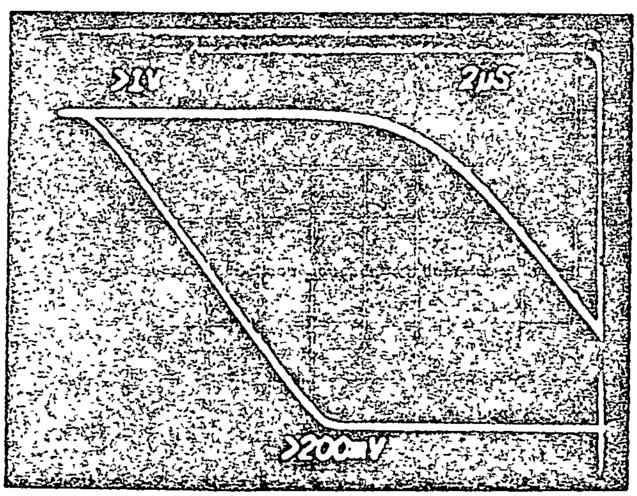
VERIFY
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 6

DELAY TIME
12.6 μSec



BAND 5
CHANNEL 6

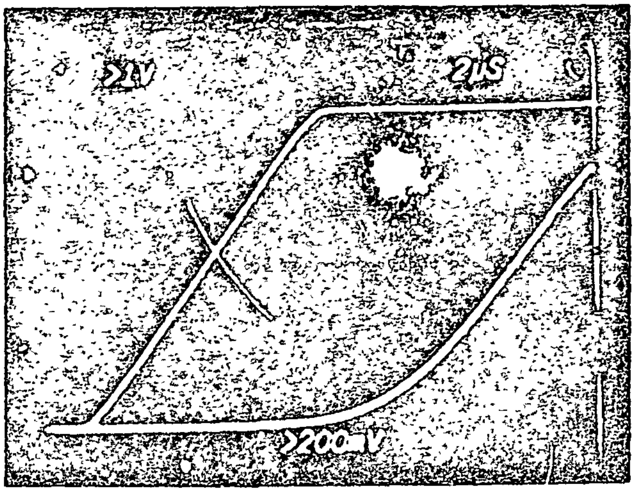
DELAY TIME
13.1 μSec

N.C. DAVISON

DATE: 02-10-82

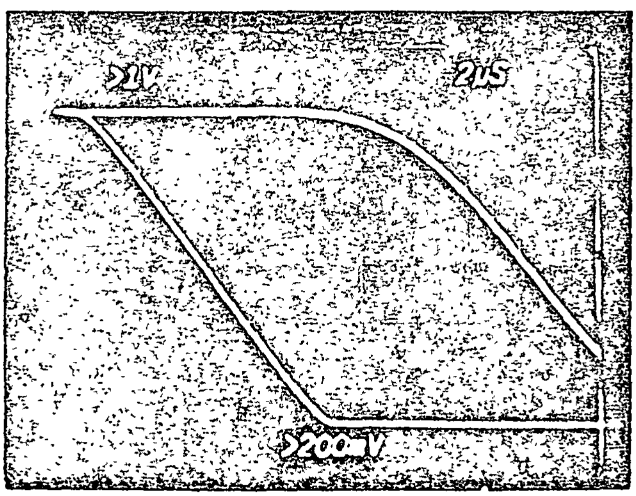
VERIFY
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 7

DELAY TIME
11.9 μSec



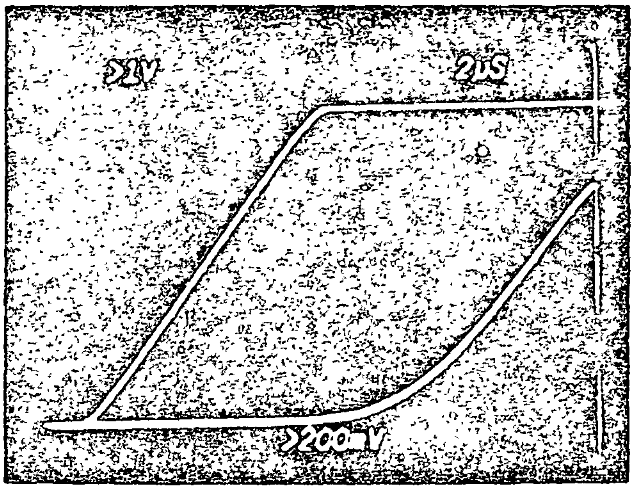
BAND 5
CHANNEL 7

DELAY TIME
12.4 μSec

N.C. DAVISON

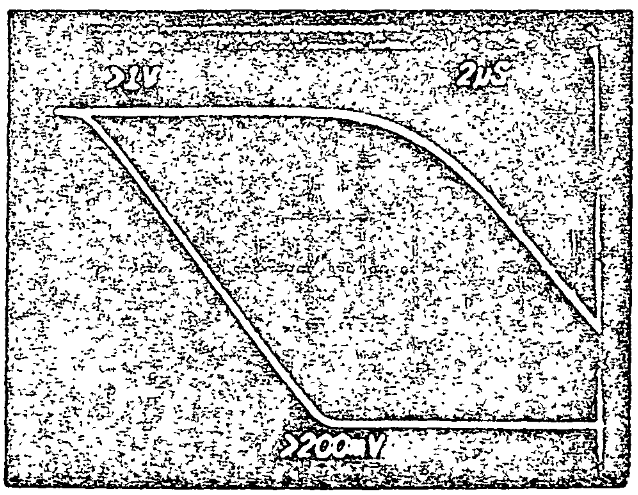
DATE: 02-10-82
VERIFY
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 8

DELAY TIME
12.4 μSec



BAND 5
CHANNEL 8

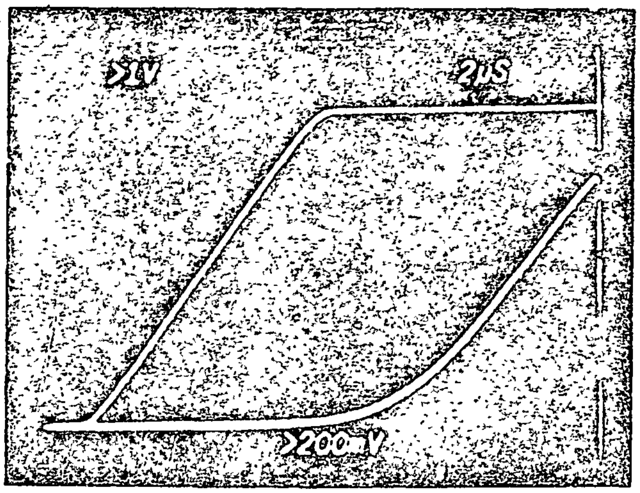
DELAY TIME
13.0 μSec

N.C. DAVISON

DATE: 02-10-82

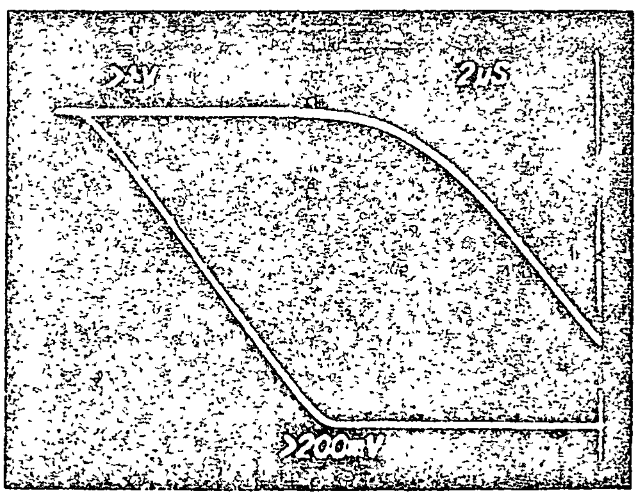
VERIFY
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 9

DELAY TIME
12.0 μSec



BAND 5
CHANNEL 9

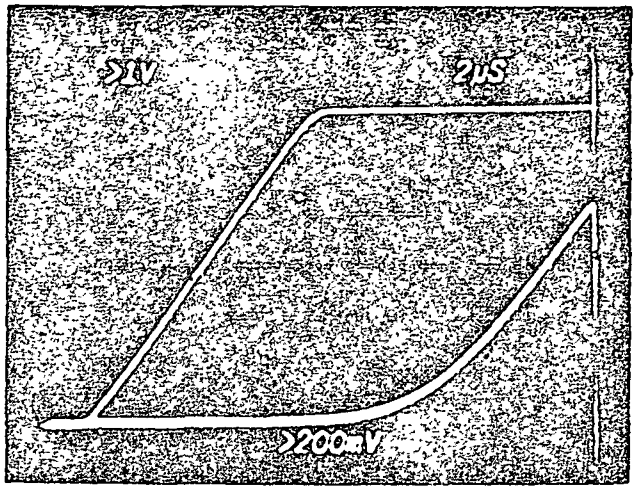
DELAY TIME
12.7 μSec

N.C. Davison

DATE: 02-10-82

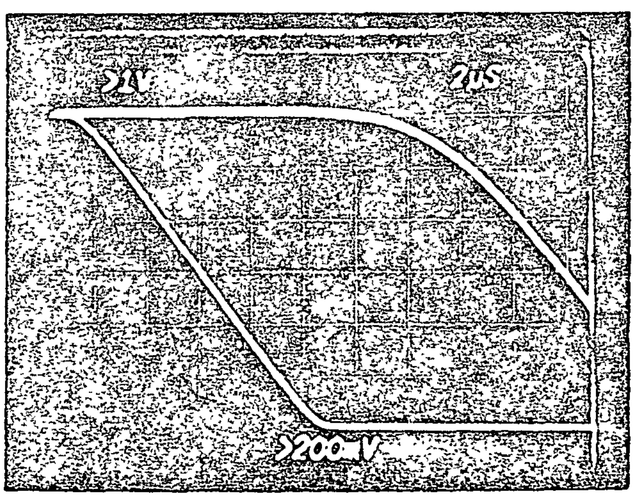
VERIFY
2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 10

DELAY TIME
13.0 µSec



BAND 5
CHANNEL 10

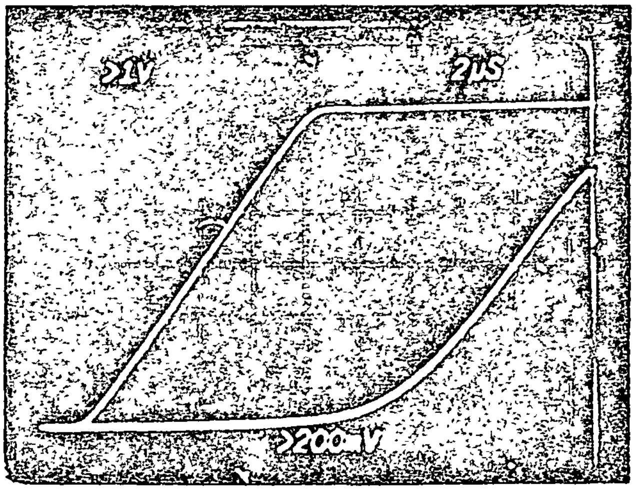
DELAY TIME
13.8 µSec

VERIFY 2/11/82

N.C. DAVISON

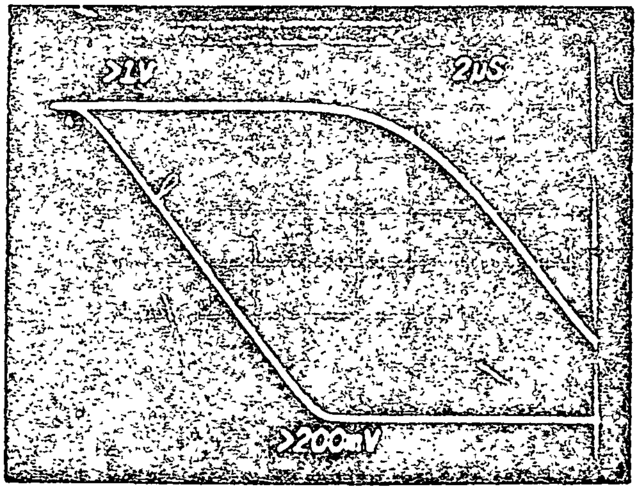
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 11

DELAY TIME
12.0 μSec



BAND 5
CHANNEL 11

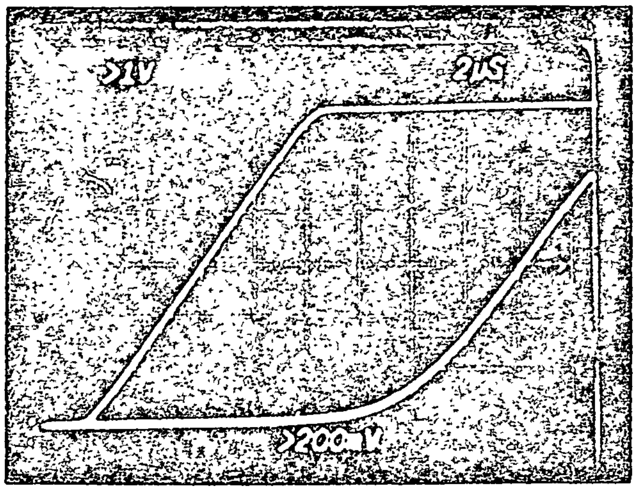
DELAY TIME
12.5 μSec

VERIFY 2/11/82

N.C. DAVISON

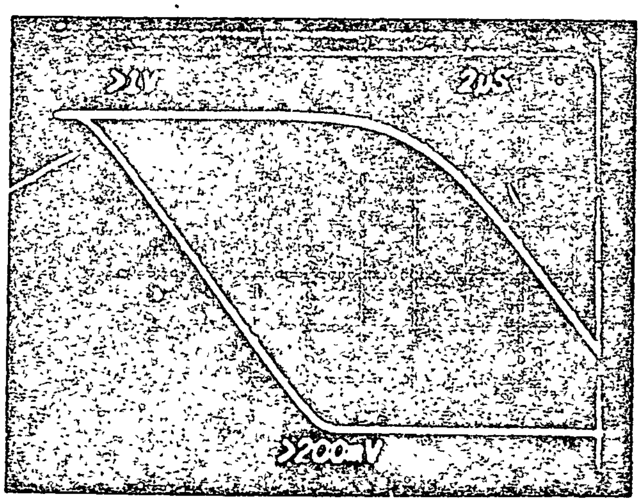
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 12

DELAY TIME
12.2 µSec



BAND 5
CHANNEL 12

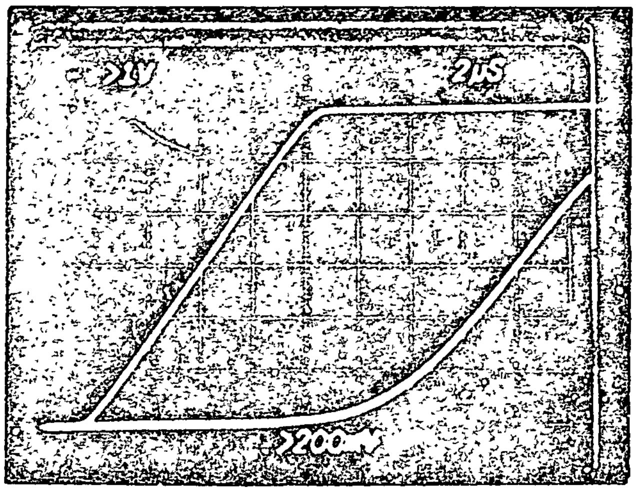
DELAY TIME
12.8 µSec

VERIFY
2/11/82

N.C. DAVISON

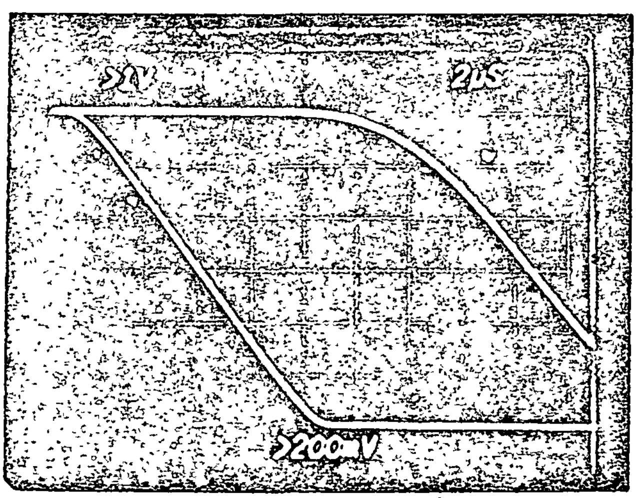
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 13

DELAY TIME
12.0 μSec



BAND 5
CHANNEL 13

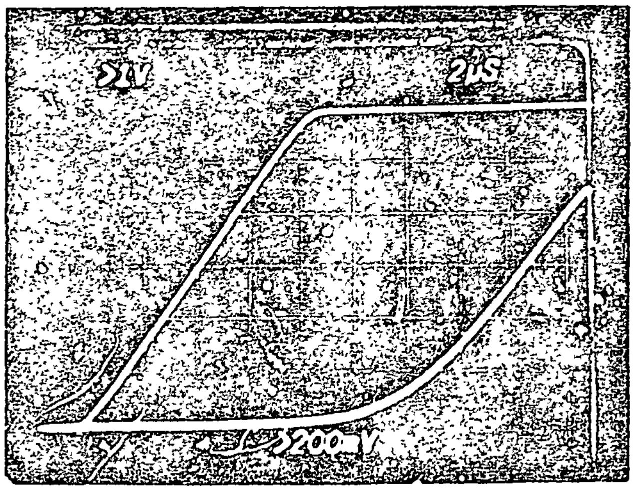
DELAY TIME
12.5 μSec

VERIFY
118 2/11/82

N.C. DAVISON

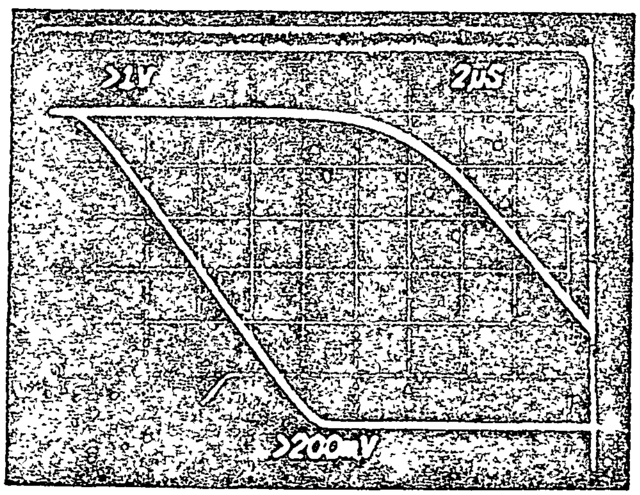
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 14

DELAY TIME
12.4 μSec



BAND 5
CHANNEL 14

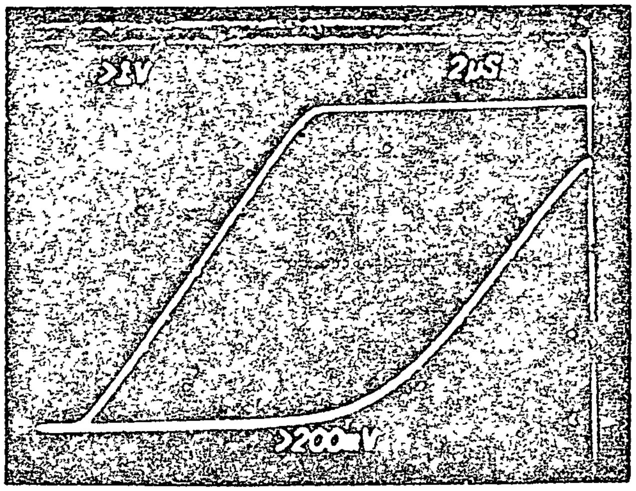
DELAY TIME
13.0 μSec

VERIFY 2/11/82

N.C. Davison

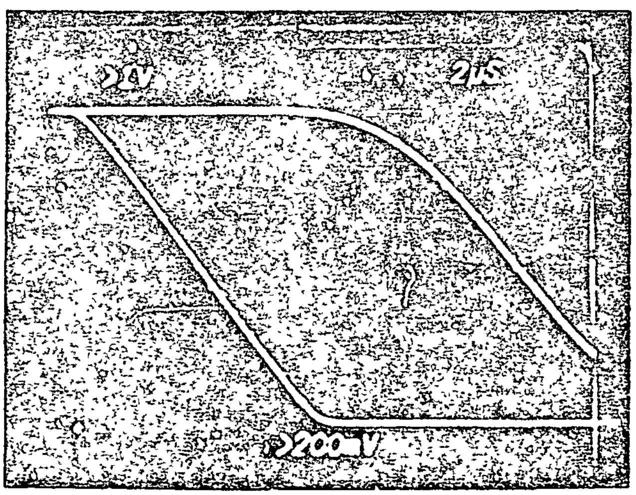
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 15

DELAY TIME
11.6 μSec



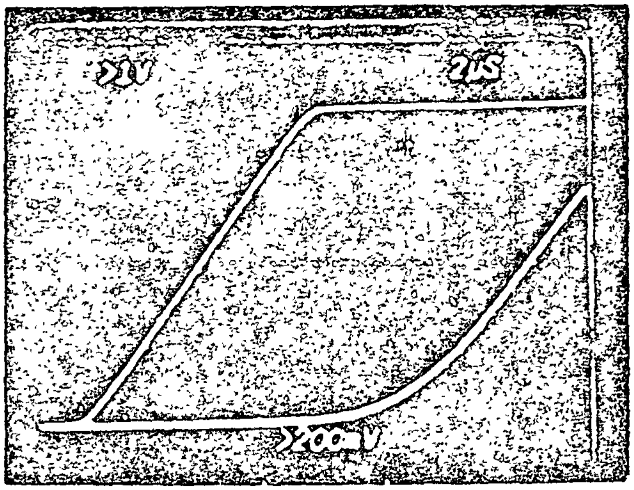
BAND 5
CHANNEL 15

DELAY TIME
12.1 μSec

N.C. DAVISON

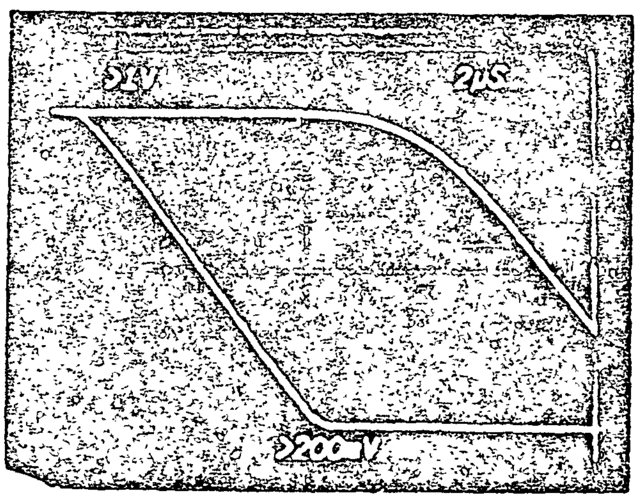
DATE: 02-10-82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 5
CHANNEL 16

DELAY TIME
12.6 μSec



BAND 5
CHANNEL 16

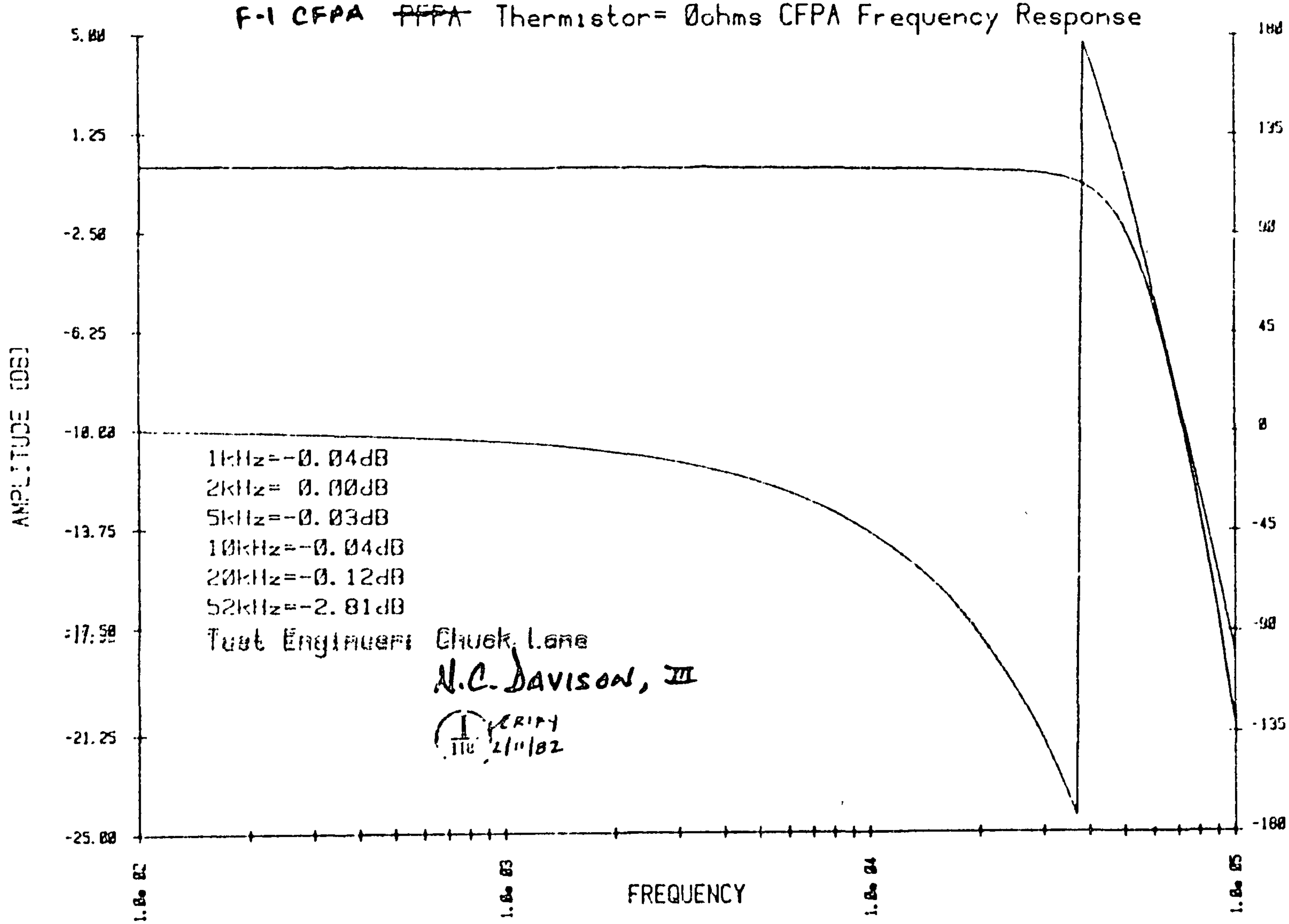
DELAY TIME
13.1 μSec

N. C. DAVISON

DATE: 02-10-82

BAND 5 CHANNEL 1 02/09/82

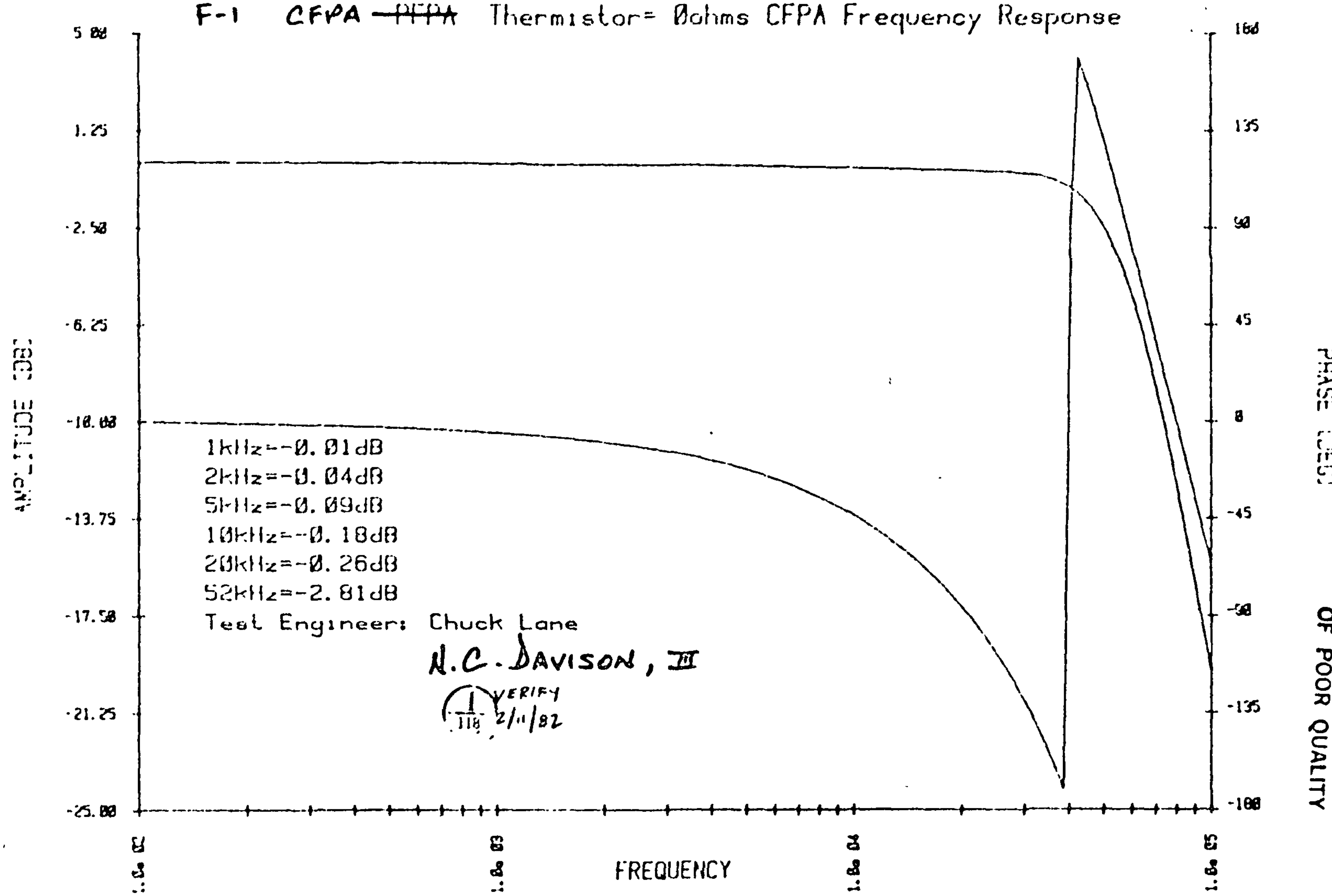
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 5 CHANNEL 2 02/09/82

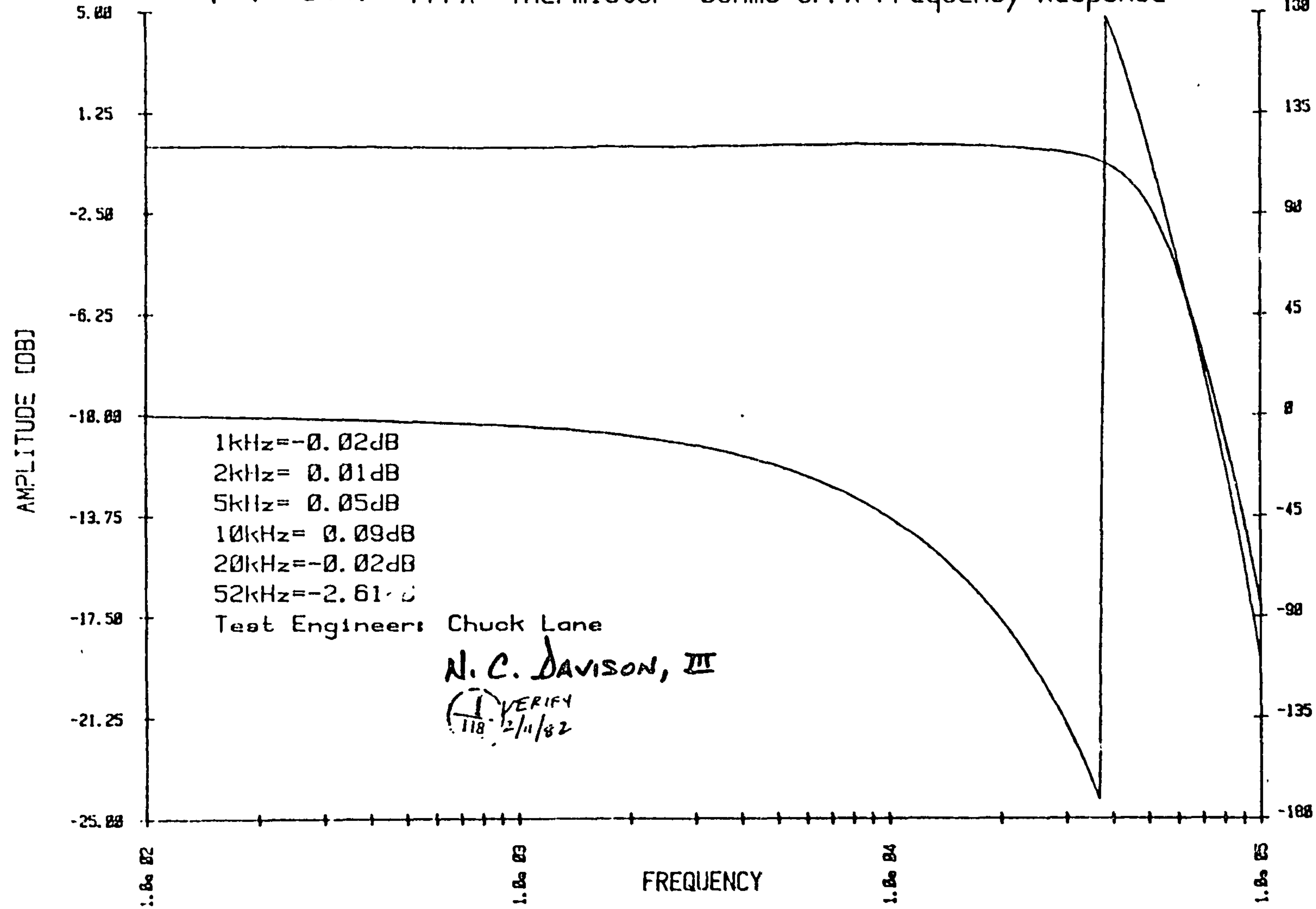
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



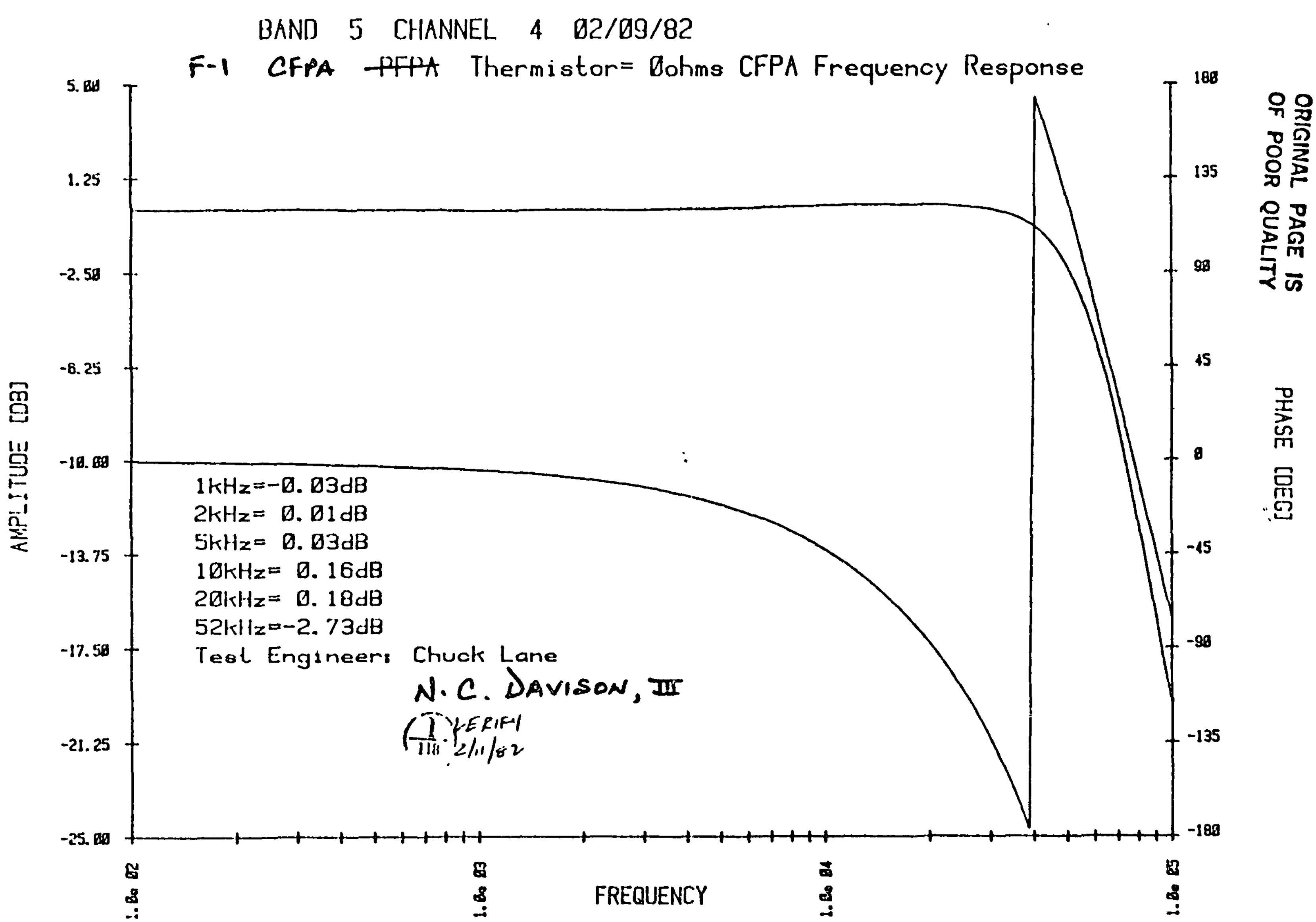
ORIGINAL PAGE IS OF POOR QUALITY

BAND 5 CHANNEL 3 02/09/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response

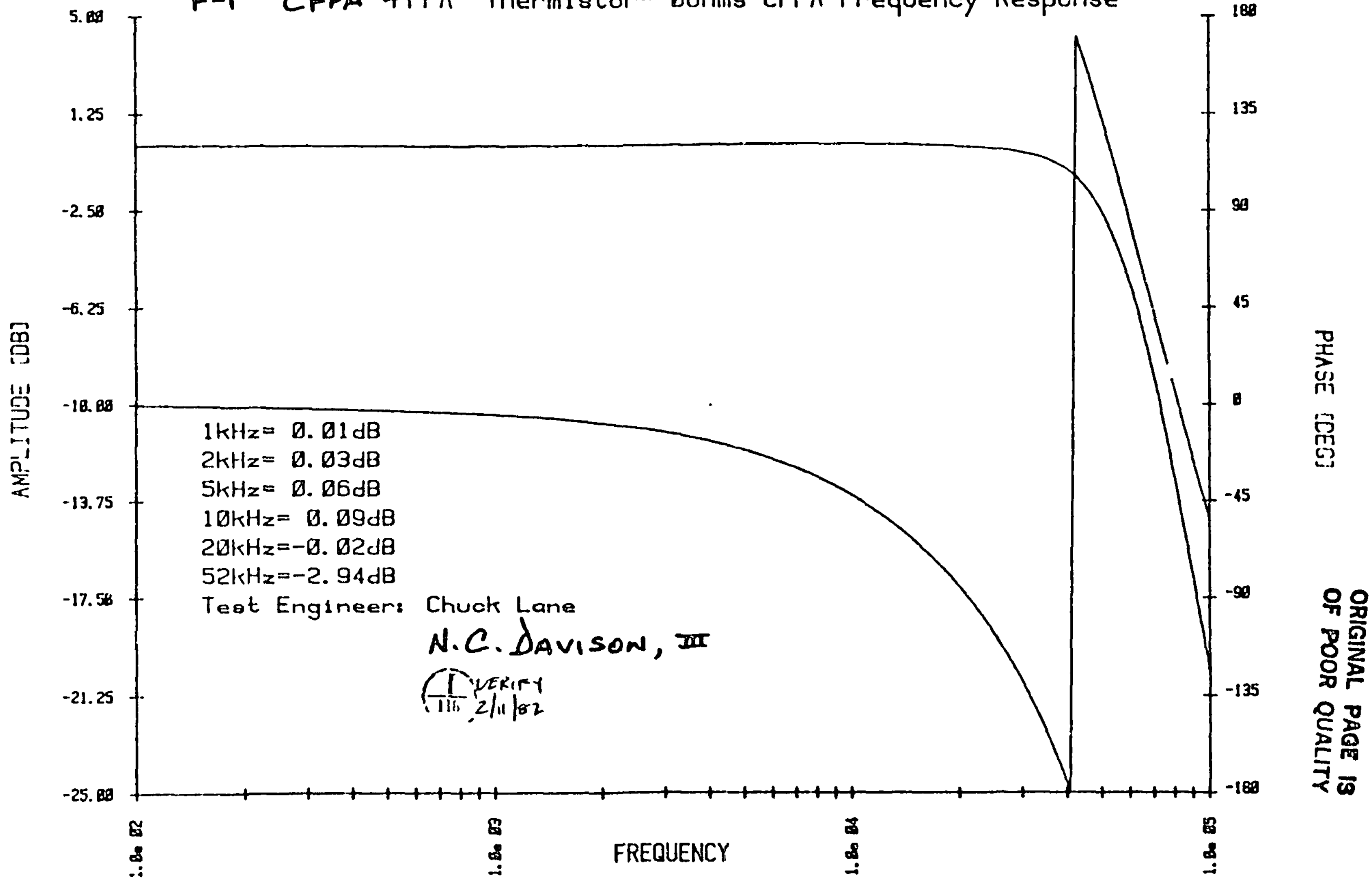


ORIGINAL PAGE IS OF POOR QUALITY


BAND 5 CHANNEL 4 02/09/82
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Frequency Response
ORIGINAL PAGE IS OF POOR QUALITY
AMPLITUDE [DB]
PHASE [DEG]
FREQUENCY
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
180
135
90
45
0
-45
-90
-135
-180
1.0e 02
1.0e 03
1.0e 04
1.0e 05
1kHz=-0.03dB
2kHz= 0.01dB
5kHz= 0.03dB
10kHz= 0.16dB
20kHz= 0.18dB
52kHz=-2.73dB
Test Engineer: Chuck Lane
N. C. DAVISON, III
VERIFI 2/11/82

BAND 5 CHANNEL 5 02/09/82

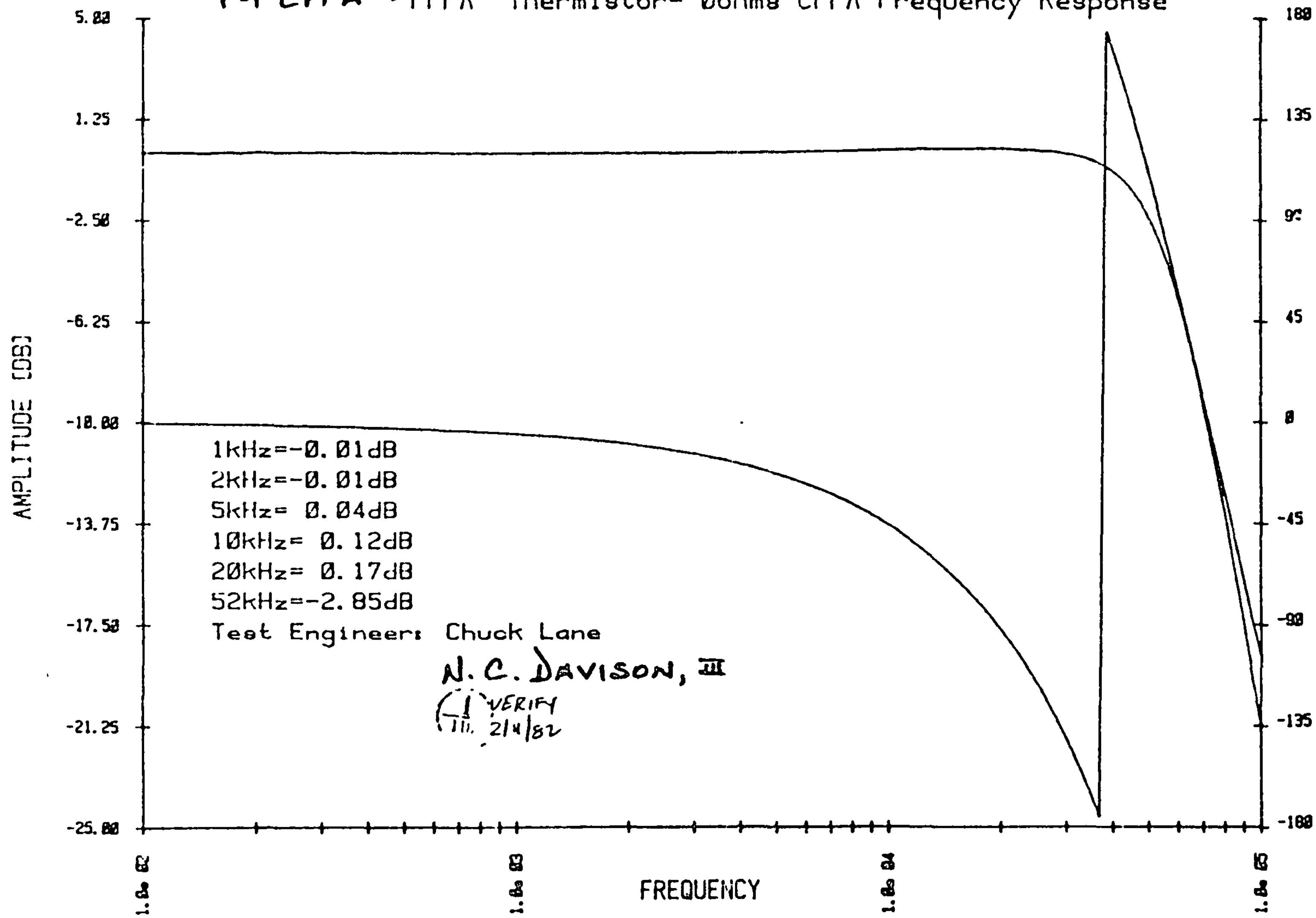
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS OF POOR QUALITY

BAND 5 CHANNEL 6 02/09/82

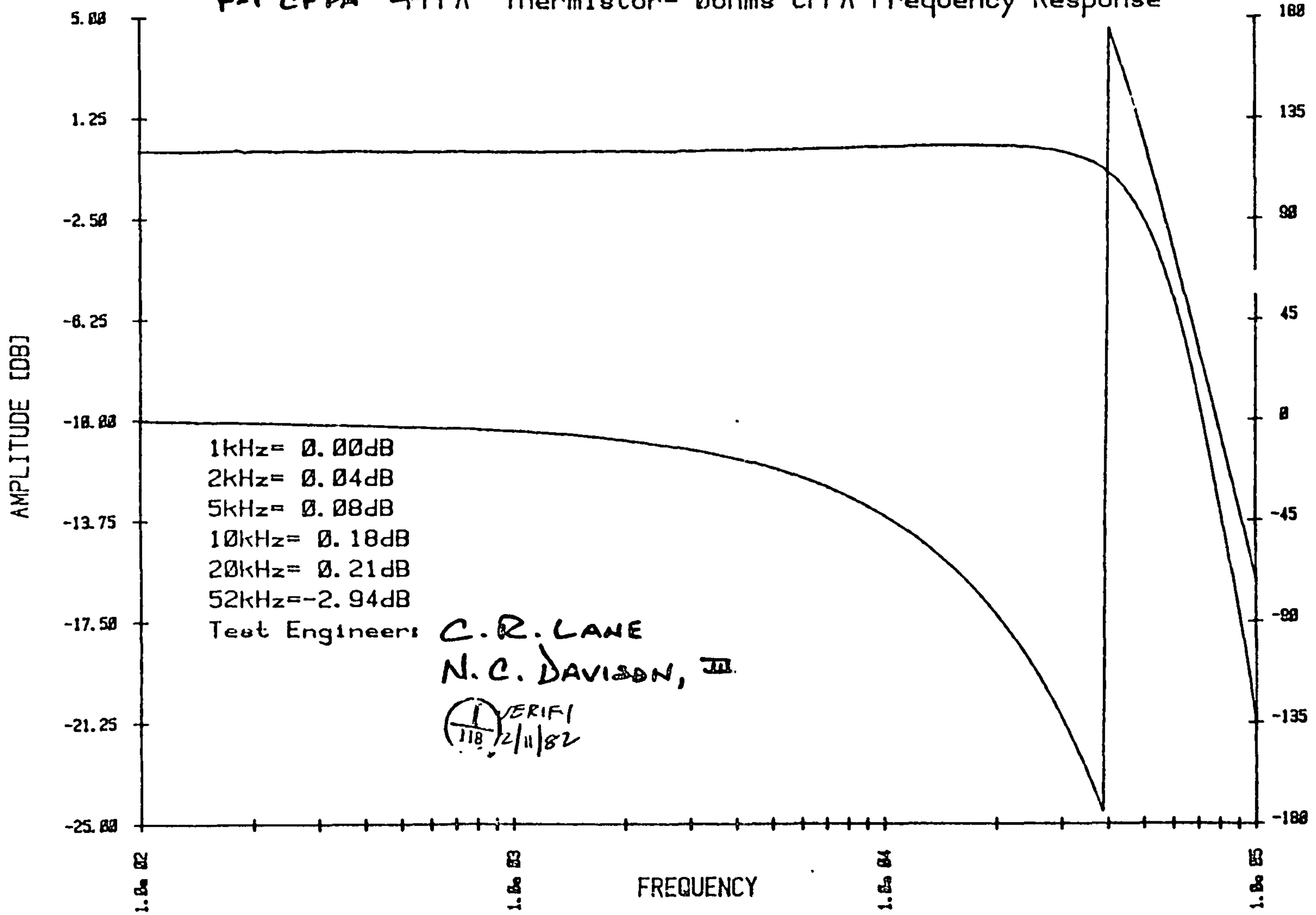
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 5 CHANNEL 7 02/09/82

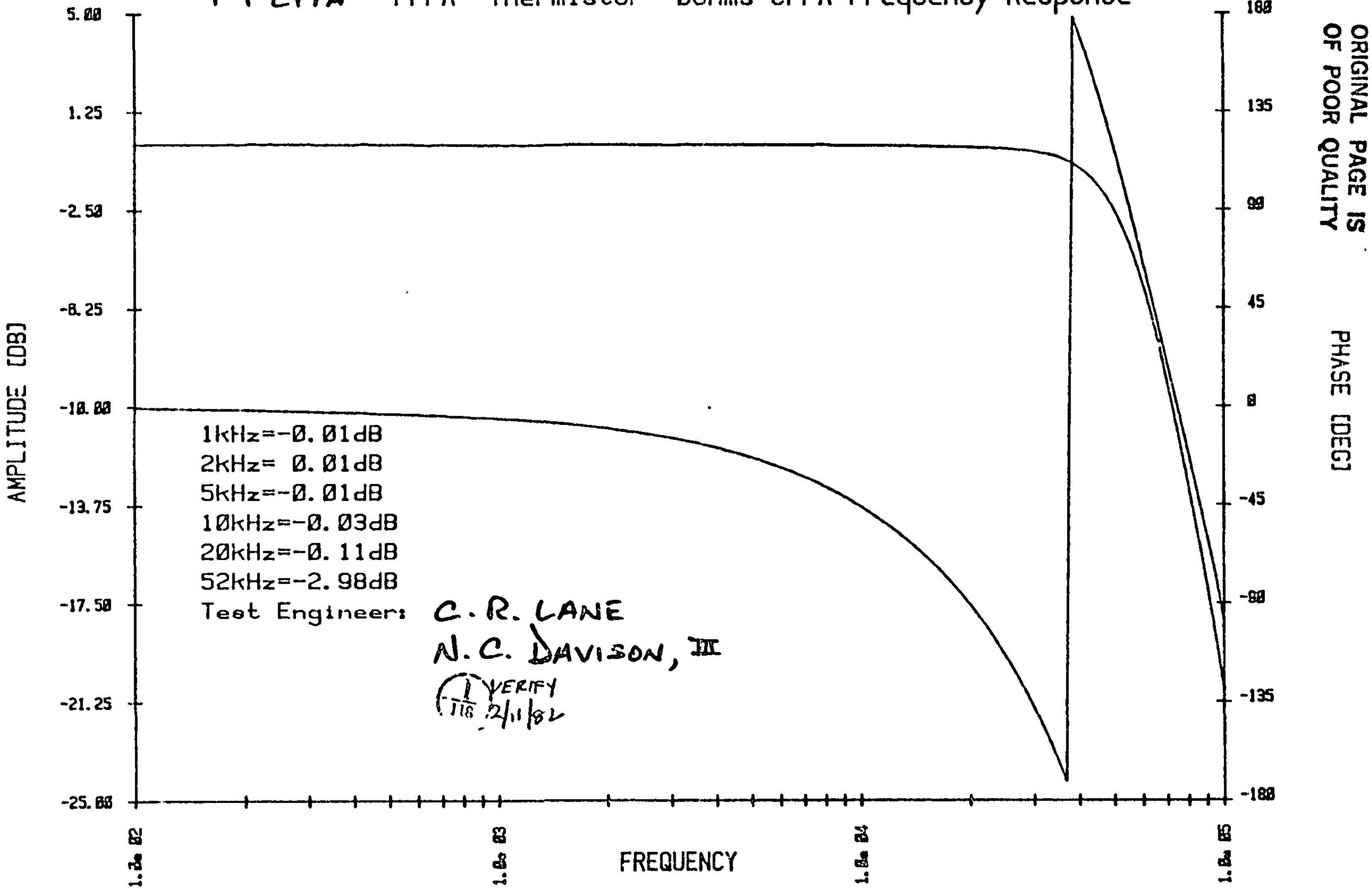
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

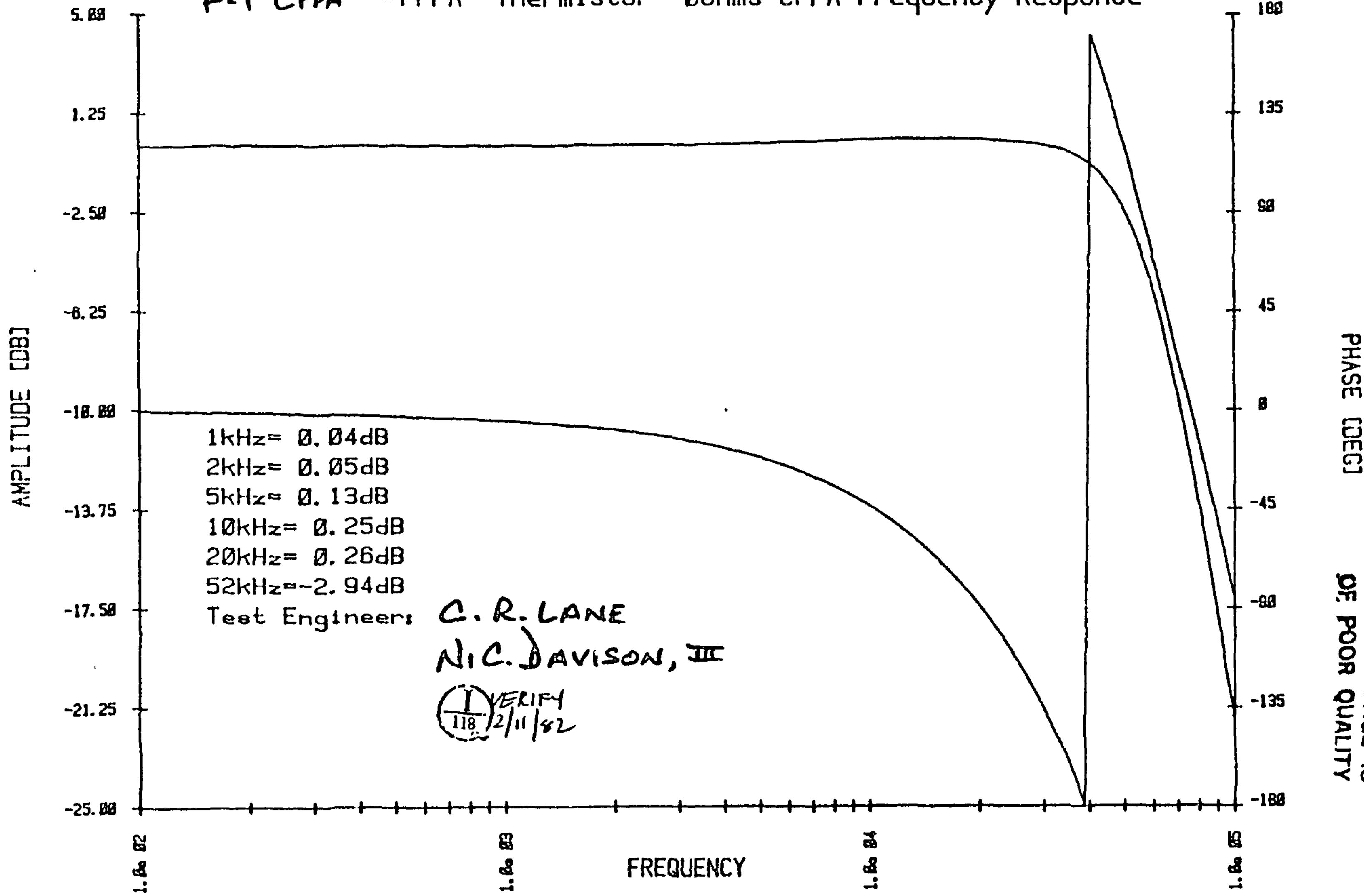
BAND 5 CHANNEL 8 02/09/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



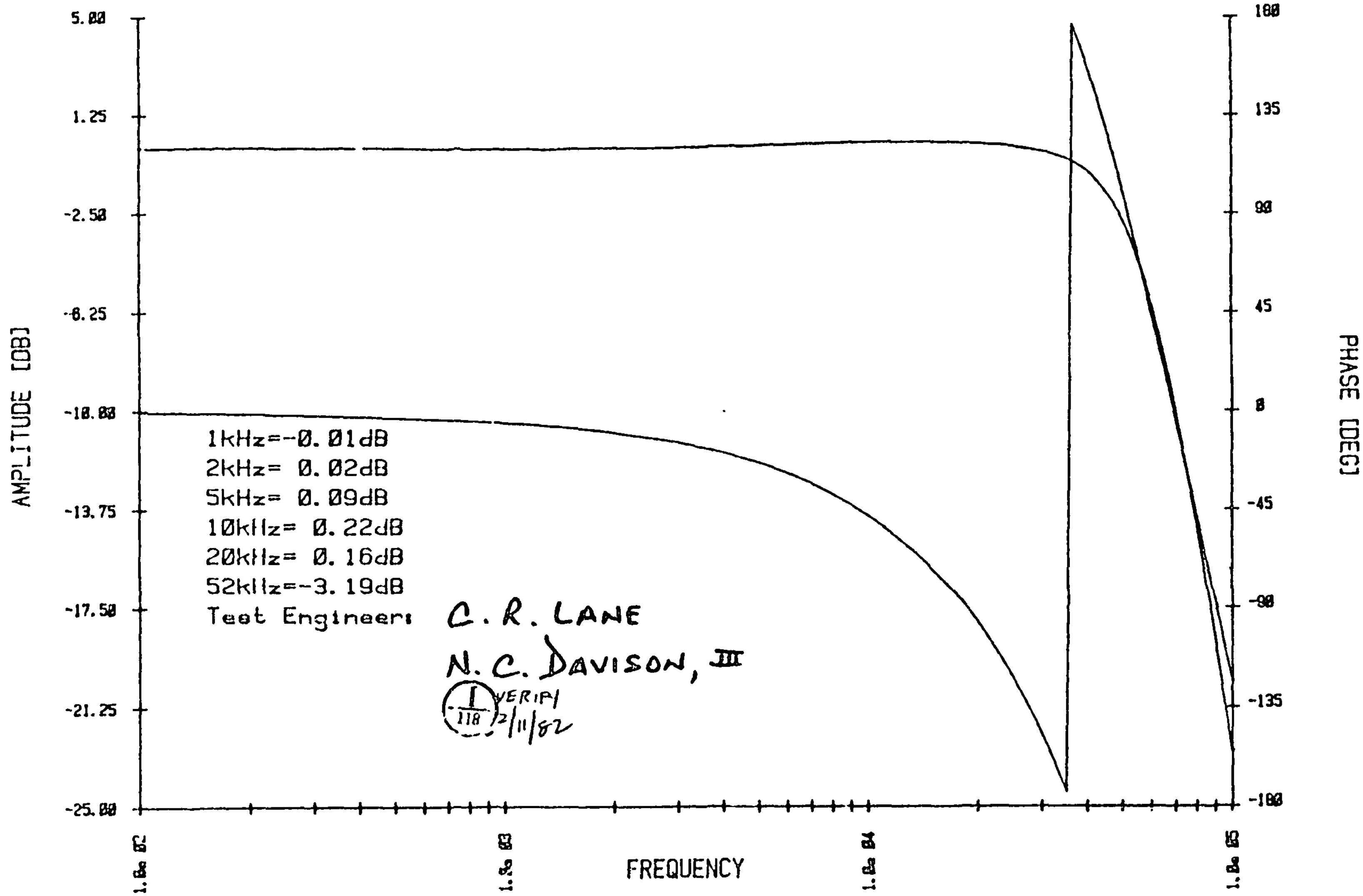
BAND 5 CHANNEL 9 02/09/82

F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Frequency Response



BAND 5 CHANNEL 10 02/09/82

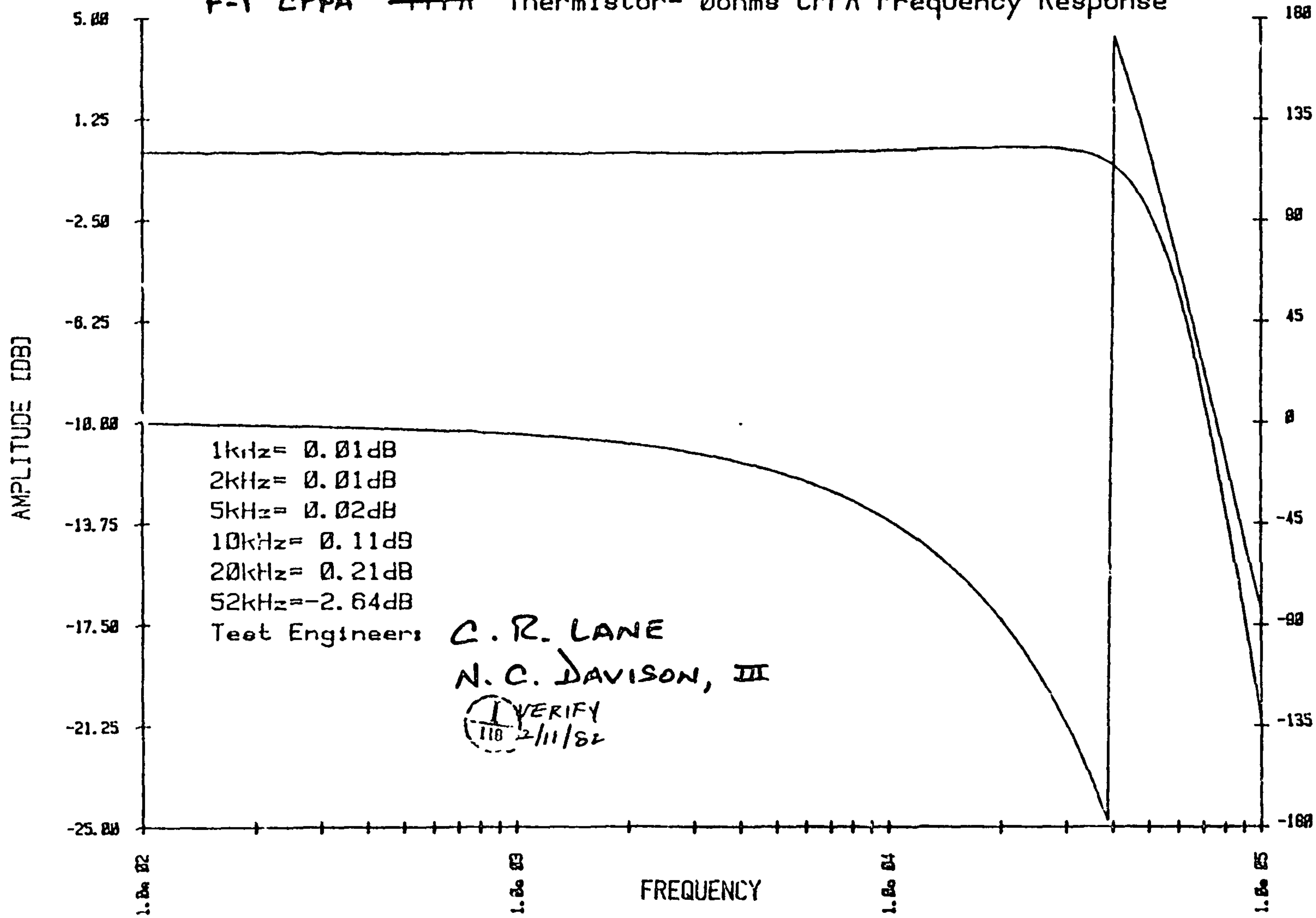
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

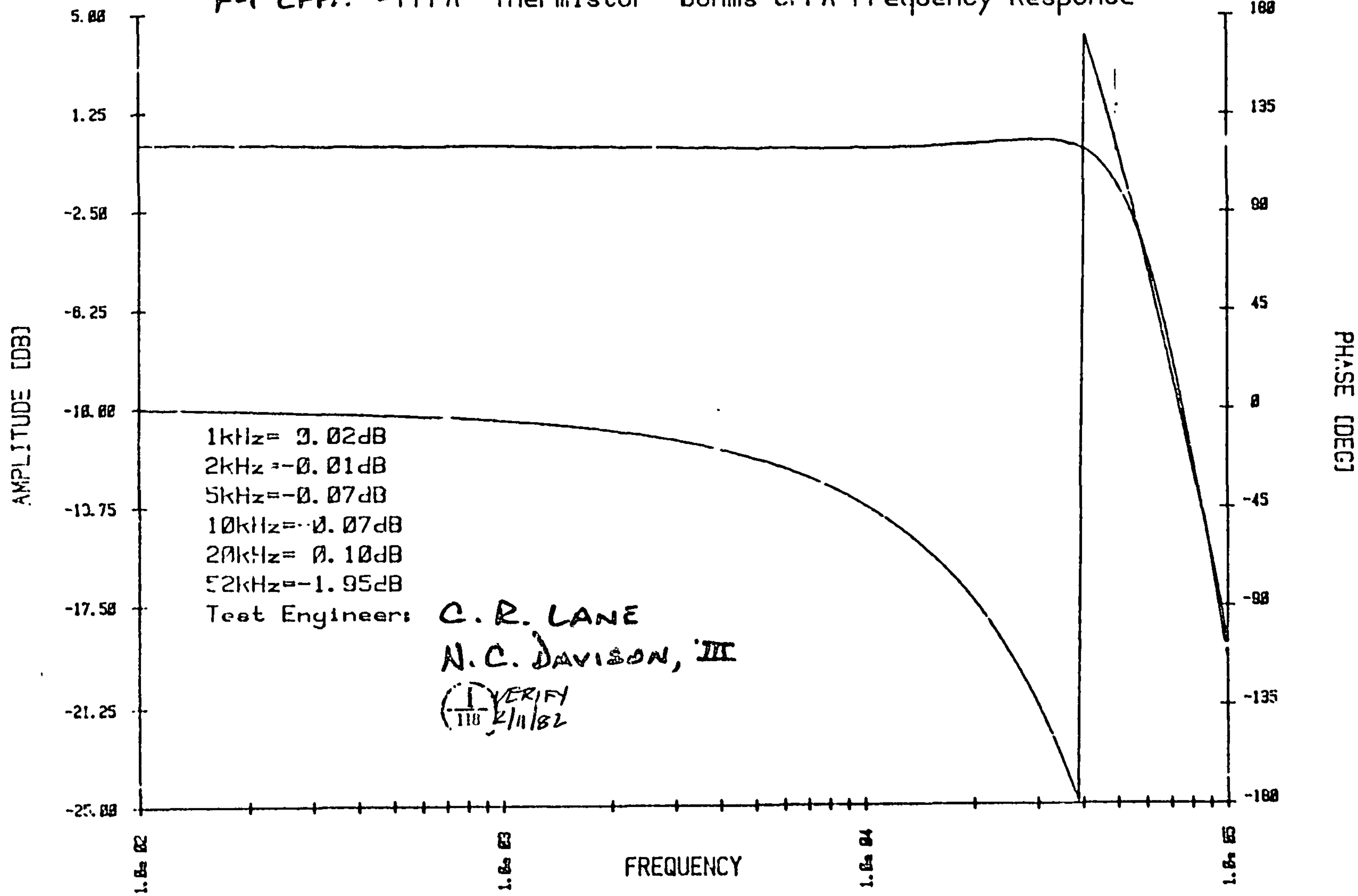
BAND 5 CHANNEL 11 Ø2/Ø9/82

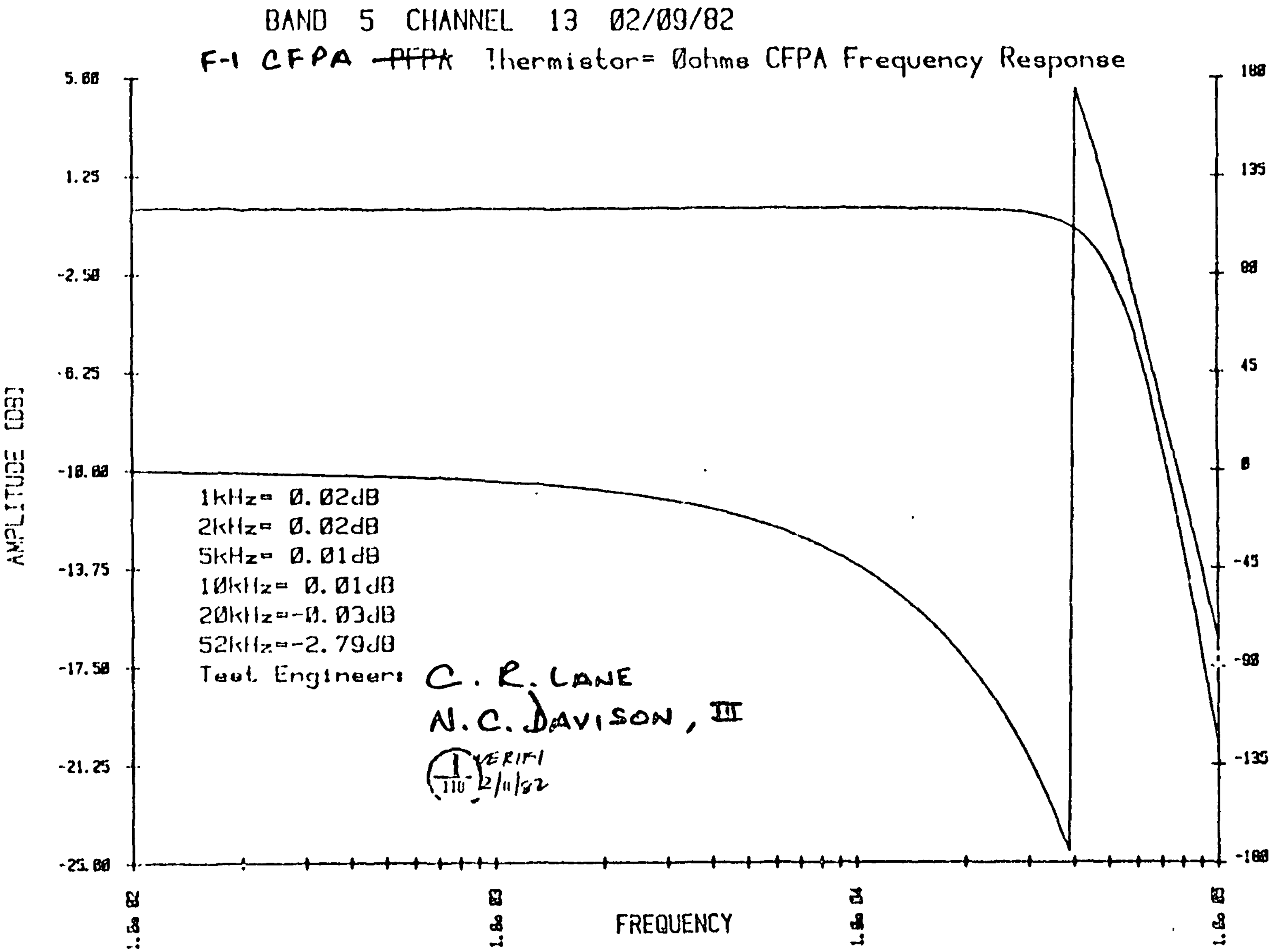
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Frequency Response



BAND 5 CHANNEL 12 02/09/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response

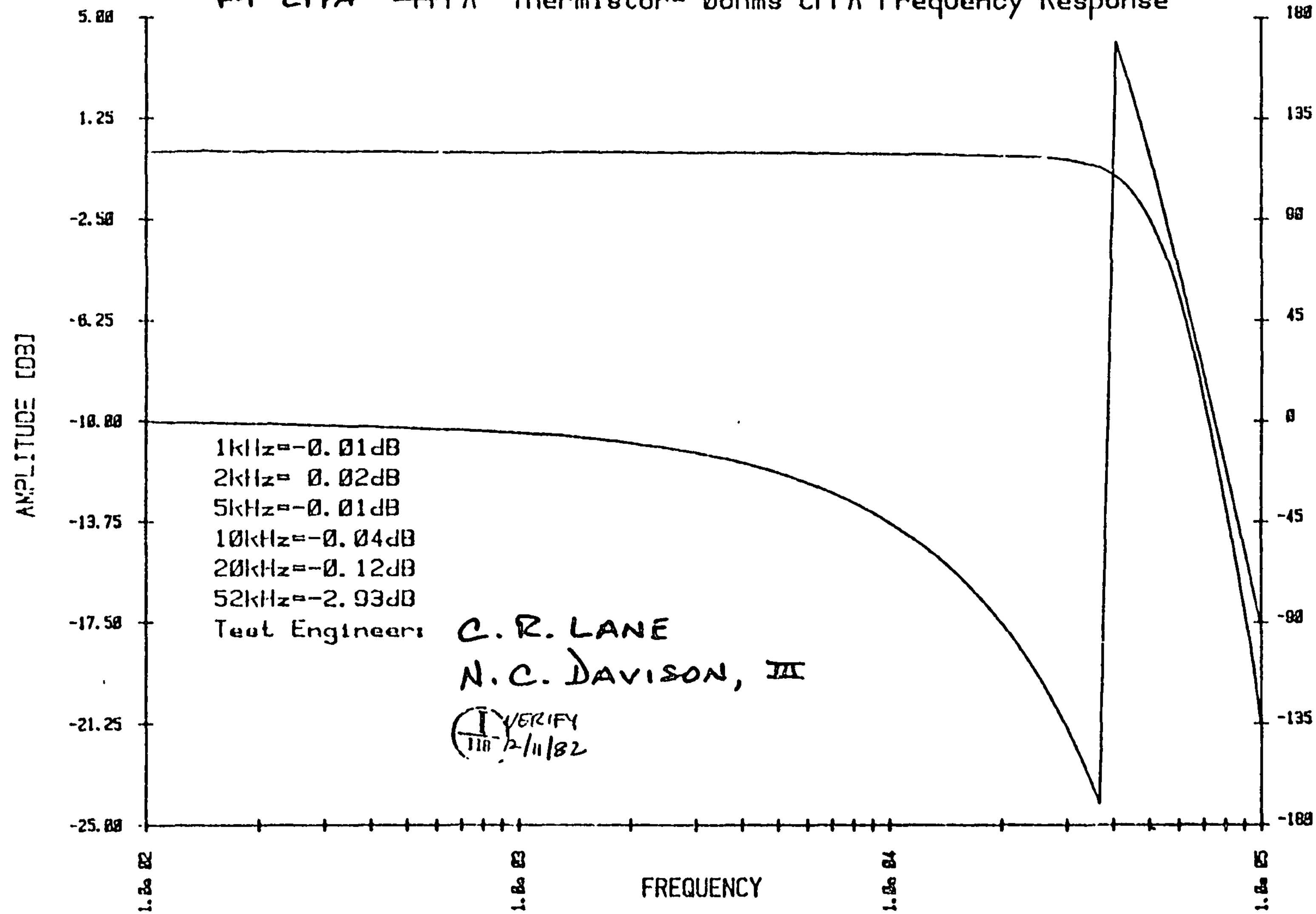




ORIGINAL PAGE IS OF POOR QUALITY

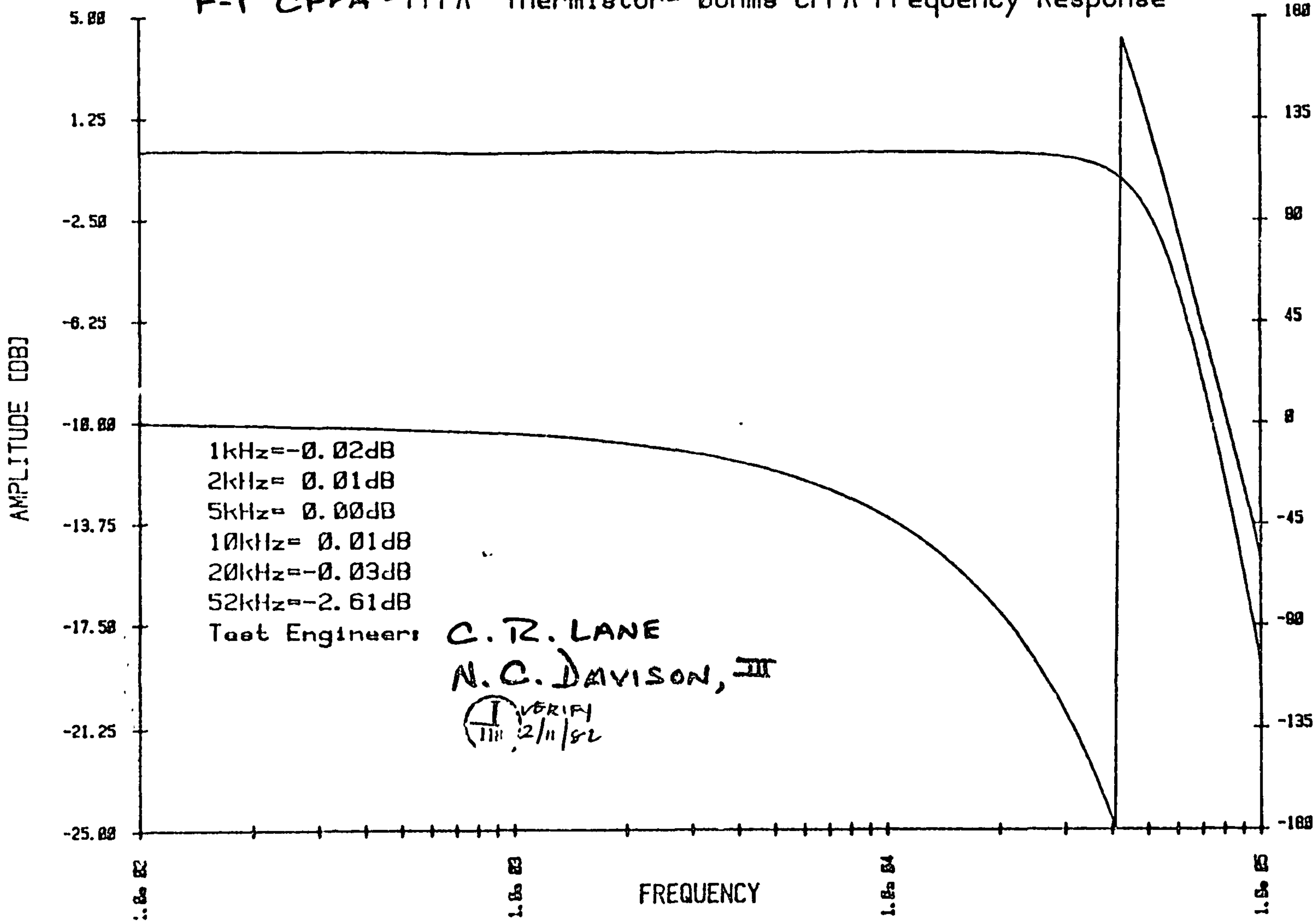
BAND 5 CHANNEL 14 02/09/82

F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Frequency Response



BAND 5 CHANNEL 15 02/09/82

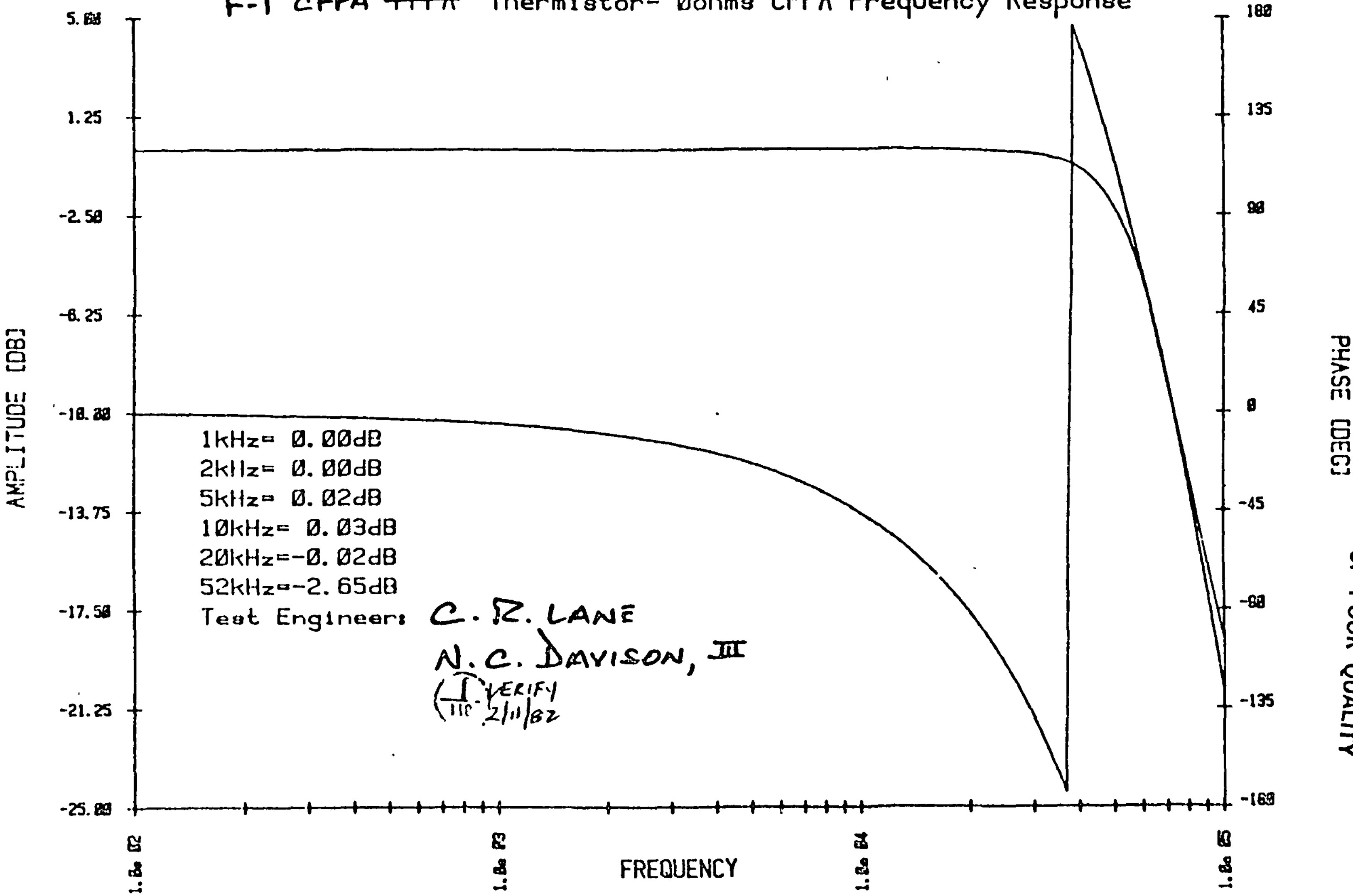
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 5 CHANNEL 16 02/09/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS
OF POOR QUALITY

FLIGHT

TEST SHEET I

D.C. OFFSET TEST

CFPA SERNO 201 BAND 5 DATE 13DEC 81

T1 READING .972 VOLTS = ______ °K TEST ENGINEER

T2 READING .972 VOLTS = ______ °K Robert O. Anderson

DRAIN CURRENT 155.4 μa DRAIN VOLTAGE 3.9 VOLTS DC
100μa to 1000μa 2.5 to 4.5 VDC

CHANNEL	VOLTS .02 TO 1.5VDC SIGNAL	REF	SIGNAL-REF (mV) ± 10mV	COMMENTS--
1	.422	.423	-1	
2	1.044	1.042	2	
3	.251	.258	-7	
4	.498	.494	4	
5	.508	.511	-3	
6	.353	.350	3	
7	.688	.680	8	
8	.294	.303	-9	
9	.205	.200	5	
10	.129	.123	6	
11	.214	.207	7	
12	.509	.503	6	
13	.844	.833	11	* FR F2357 28 JAN 81
14	.098	.099	-1	
15	.106	.105	1	
16	.143	.142	1	

DESIGN ENGINEER [illegible signature]

METERS USED	MODEL	SERNO	CAL DUE DATE
1)	HP3435A	SBRC 803267	29 JAN 81
2)	HP3435A	SBRC 803265	29 JAN 81
3)	TP335	SBRC S07772	NCR

118 VERIFY
NOTE: DETECTOR NOT CONNECTED
12/13/81

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
	SCALE	REV	SHEET

ORIGINAL PAGE IS
OF POOR QUALITY

FLIGHT
POST PREAMP RESISTOR
SELECT TEST

TEST SHEET I

ORIGINAL PAGE IS
OF POOR QUALITY

D.C. OFFSET TEST

CFPA SERNO 201 BAND 5 DATE 23 Oct 81

T1 READING .978 VOLTS = ____ °K TEST ENGINEER

T2 READING .978 VOLTS = ____ °K R.O. Anderson

DRAIN CURRENT 156.7 μa (100μa to 1000μa) DRAIN VOLTAGE 3.91 VOLTS DC (2.5 to 4.5 VDC)

CHANNEL	VOLTS .02 TO 1.8VDC SIGNAL	VOLTS .02 TO 1.8VDC REF	SIGNAL-REF (mV) ± 10mV	COMMENTS--
1	.417	.417	0	
2	1.039	1.036	3	
3	.246	.252	-6	
4	.493	.482	11	
5	.503	.505	-2	
6	.348	.345	3	
7	.683	.674	9	
8	.290	.298	-8	
9	.200	.195	5	
10	.123	.118	5	
11	.209	.202	7	
12	.505	.498	7	
13	.539	.526	13	* FR F2387 25JAN81
14	.094	.094	0	
15	.101	.100	1	
16	.138	.137	1	

DESIGN ENGINEER ____________

METERS USED		MODEL	SERNO	CAL DUE DATE
	1)	3438A	SBRC 803267	29JAN82
	2)	3435A	SBRC 803268	29JAN82
	3)	TP325	SBRC 802772	NCR

* FR written on 29JAN81 for this ch. 13

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
	SCALE	REV D	SHEET 28

FORM NO. DIETZGEN-POST CLEARPRINT 1000

ORIGINAL PAGE IS OF POOR QUALITY

FLIGHT

TEST SHEET 3

CFPA SERNO 2?1 BAND 5 DATE 23 OCT 81

T1 READING .978 VOLTS = 91 °K

T2 READING .978 VOLTS = 91 °K

TEST ENGINEER R.C. Anderson

20 mV RMS SINE WAVE IN.

CHANNEL	FREQUENCY (Hz) OUTPUT IN mV						FREQUENCY (Hz)		COMMENTS
	3.9mV MIN						70-110	2.9K to 9K	
	10	100	1K	10K	50K	100K	LOWER 3db POINT	UPPER 3db POINT	
1	11.3	8.2							
2	13.5	9.3							
3	11.1	8.1							
4	12.7	8.7							
5	11.9	8.2	SEE NOTE 2						
6	13.5	8.8							
7	11.8	8.1	IN REGARDS						
8	13.3	8.8	TO DATA NOT						
9	11.7	8.3							
10	19.9	14.0	TAKEN.						*SEE FR # 8226
11	11.2	8.2							
12	14.3	9.4							
13	11.4	8.3							
14	14.0	9.3							
15	11.9	8.3							
16	13.3	9.0							

DESIGN ENGINEER R.C. Anderson

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1)	~~3435A~~ 3570A	56EC 803413	17 FEB 82
2)	~~3435A~~ 3330B	56EC 803412	17 FEB 82
3)	3400A	G-456798	19 JAN 82
4)	TI 325	56EC 802772	NCR

NOTE: 1) * SEE FR # 8226

2) NOT REQUIRED PER PROJECT ENGINEER (D. CHANDALL)

TITLE

PRECEDING PAGE BLANK NOT FILMED

SIZE	CODE IDENT NO	NUMBER
A	11323	16192

SCALE REV D SHEET 31

ORIGINAL PAGE IS
OF POOR QUALITY

.S:

BIAS ADJUST BAND 5 FLIGHT TEST SHEET 7A

DATE: 18 Dec 81

CFPA SERNO 201 WITH PREAMP ASSY 50988

PREAMP SERNO 201

T1 READING .976 VOLTS = 92 °K TEST ENGINEER

T2 READING .976 VOLTS = 92 °K R.C. Anderson

Reselect for ch 3

CHANNEL	(±10mV) FEEDBACK mV	SIGNAL LINE OHMS (1K MAX)	R NUMBER	SELECT PART 908600-	C NUMBER	SELECT PART 908504-	COMMENTS
1			R6		C23		
2			R5		C22		
3	-0.4		R7	79	C24	24	
4			R4		C21		
5			R8		C25		
6			R3		C20		
7			R9		C26		
8			R2		C19		
9			R10		C27		
10			R17		C34		
11			R11		C28		
12			R16		C33		
13			R12		C29		
14			R15		C32		
15			R13		C30		
16			R14		C31		

DESIGN ENGINEER R.C. Anderson

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1)	8020A	SBRC 801383	3 AUG 82
2)	6255A	~~SBRC~~ NASA 457601	NCR
3)	7603	SBRC 803489	27 JAN 82
4)	7A22	SBRC 803435	22 JAN 82
5)	7055A	SBRC 803497	27 JAN 82

118 VERIFY FEEDBACK IN SPEC AFTER RESELECTION OF CAPACITOR. NOTE: DETECTOR NOT CONNECTED 12/18/81

PER 50986 AHR
SUPP #2 OF F802

SIZE	CODE IDENT NO.	NUMBER	
A	11323	16192	
SCALE	REV 3	SHEET 33	

.S:

BIAS ADJUST BAND 5 **ORIGINAL PAGE IS OF POOR QUALITY** FLIGHT TEST SHEET 7A

DATE: 14 DEC 81

CEPA SERNO 201 WITH PREAMP ASSY 50988

PREAMP SERNO 201

TI READING .981 VOLTS = °K TEST ENGINEER

T2 READING .980 VOLTS = °K Robert O. Anderson

NOTE: READINGS TAKEN WITH NO DETECTORS AND R+C PRESELECTED ON PREAMP BOARD PER TEST ON 23 OCT 81 WITH DETECTORS.

CHANNEL	(±10mV) FEEDBACK mV	SIGNAL LINE OHMS (IK MAX)	R NUMBER	SELECT PART 908600-	C NUMBER	SELECT PART 908504-	COMMENTS
1	1.7		R6		C23		
2	-0.4		R5		C22		
3	0.4		R7		C24		OSCILLATION; NEEDS R+C PRESELECT *
4	0.7		R4		C21		
5	0.8		R8		C25		
6	0.6		R3		C20		
7	1.1		R9		C26		
8	1.2		R2		C19		
9	0.3		R10		C27		
10	-0.9		R17		C34		
11	0.3		R11		C28		
12	1.2		R16		C33		
13	0.3		R12		C29		
14	0.7		R15		C32		
15	-0.2		R13		C30		
16	1.0		R14		C31		

DESIGN ENGINEER Robert O Anderson

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
	1) TP325	SBRC #802772	NCR
	2) 7603	SBRC # 803498	27 JAN 82
	3) 7A22	SBRC # 803455	22 JAN 82
	4) 7853A	SBRC # 803490	27 JAN 82
	5) 8020A	SBRC # 801383	23 AUG 82

NOTE * SEE FAILURE REPORT S 8205

VERIFY NOTE: DETECTOR NOT CONNECTED 12/14/81

SIZE	CODE IDENT NO.	NUMBER
A	11323	16192
SCALE	REV 3	SHEET 33

S ADJUST BAND 5 FLIGHT ORIGINAL PAGE IS OF POOR QUALITY TEST SHEET 7A

DATE: 13 Dec 81

PA SERNO 201 WITH PREAMP ASSY 50958

AMP SERNO 201

READING .977 VOLTS = ______ °K TEST ENGINEER

READING .977 VOLTS = ______ °K Robert C. Anderson

ANNEL	(±10mV) FEEDBACK mV	SIGNAL LINE OHMS (IK MAX)	R NUMBER	SELECT PART 908600-	C NUMBER	SELECT PART 903504-	COMMENTS
1	26.2		R6		C23		Slight osc. needs C + R reselected *
2	132.0		R5		C22		
3	8.5		R7		C24		Has 150mv p/p square wave +
4	33.6		R4		C21		
5	33.1		R8		C25		
6	13.9		R3		C20		
7	57.1		R9		C26		
8	8.9		R2		C19		Slight osc. needs cap and R reselected *
9	3.2		R10		C27		
10	00.3		R17		C34		
11	4.2		R11		C28		
12	34.9		R16		C33		Slight osc needs C + R reselected *
13	79.5		R12		C29		
14	0		R15		C32		
15	00.3		R13		C30		
16	1.0		R14		C31		Heavy osc needs C + R reselected *

SIGN ENGINEER Robert C. Anderson

QUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1)	TP325	SBRC 802772	NCR
2)	802017	SBRC 801373	3 AUG 82
3)	7603	SBRC 803457	27 JAN 82
4)	7A22	SBRC 803435	22 JAN 82
5)	~~7~~853A	SBRC 803490	27 JAN 82

COMMENTS:

* These with osc. may be due to no detectors.

+ This appears like open feedback loop. Recommend check feedback loop of CPFA, if OK check preamp Hybrid U3 Band 5 CH 3.

1/118 VERIFY NOTE: DETECTOR NOT CONNECTED 12/13/81

SIZE	CODE IDENT NO.	NUMBER
A	11323	16192
SCALE	REV	SHEET 35

BIAS ADJUST BAND 5 — FLIGHT — TEST SHEET 7A

DATE: 23 Oct 81

CFPA SERNO 201 WITH PREAMP ASSY 50988

PREAMP SERNO 201

T1 READING .978 VOLTS = 91 °K TEST ENGINEER

T2 READING .977 VOLTS = 91 °K R.C. Anderson

CHANNEL	(±10mV) FEEDBACK mV	SIGNAL LINE OHMS (IK MAX)	R NUMBER	SELECT PART 908600-	C NUMBER	SELECT PART 908504-	COMMENTS
1	1.5	499	R6	97	C23	21	
2	1.0	499	R5	97	C22	19	
3	-0.4	324	R7	79	C24	15	
4	0.2	576	R4	103	C21	15	
5	0.3	453	R8	93	C25	18	
6	-0.1	499	R3	97	C20	22	
7	0.5	634	R9	107	C26	20	
8	0.7	348	R2	82	C19	23	
9	-0.7	604	R10	105	C27	17	
10	-0.9	649	R17	108	C34	17	
11	-0.7	604	R11	105	C28	18	
12	0.8	649	R16	108	C33	25	
13	-0.6	698	R12	111	C29	20	
14	-0.2	499	R15	97	C32	23	
15	-1.5	499	R13	97	C30	16	
16	0.5	549	R14	101	C31	24	

DESIGN ENGINEER R.C. Anderson

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
	1) FLUKE 8020A	SBRC# 801383	1 Dec 81
	2) HP 3435A	SBRC# 803268	29 JAN 82
	3) TP325	SBRC# 802772	NCR
	4)		
	5)		

I 118 ACCEPT PYR 10-23-81

JM Randall 10/23/81

ORIGINAL PAGE IS OF POOR QUALITY

[redacted]

SIZE	CODE IDENT NO.	NUMBER
A	11323	16192
SCALE	REV D	SHEET 35

BAND 5 GAIN LEVELING
PER 16192 PARAGRAPH 4.13 → TEST AHR #50973
OPERATION #2300

ORIGINAL PAGE IS
OF POOR QUALITY

BOOSTED FREQUENCY AND TRANSIENT RESPONSE BAND 5

CFPA SERNO 201 DATE FEB. 16, 1982

BAND 5 PREAMP NO. 201 BAND 5 POSTAMP NO. 201

T1 READING .976 VOLTS = 91.0 °K TEST ENGINEER C. R. Lane

T2 READING .976 VOLTS = 91.0 °K

CURRENTS: +19VDC = .076 AMPS −19VDC = .076 AMPS

150mA MAX 150mA MAX

	POST GAIN SET			PRE GAIN SET			POST GAIN CAPACITOR			BOOST CAPACITOR		
CH	NO.	OHMS (KΩ)	908600-	NO	(KΩ)	908600-	NO.	pF	908505-	NO	pF	908504-
1	R33	25.5K	-261	R81	1.27	-136	C33	0		C57	0	
2	R41	26.7	-263	R89	1.27	-136	C41			C65		
3	R34	26.7	-263	R82	1.27	-136	C34			C58		
4	R42	23.7	-258	R90	1.27	-136	C42			C66		
5	R35	26.7	-263	R83	1.27	-136	C35			C59		
6	R43	23.7	-258	R91	1.27	-136	C43			C67		
7	R36	25.5	-261	R84	1.27	-136	C36			C60		
8	R44	25.5	-261	R92	1.27	-136	C44			C68		
9	R37	32.4	-271	R85	1.27	-136	C37			C61		
10	R45	30.9	-269	R93	1.27	-136	C45			C69		
11	R38	30.9	-269	R86	1.27	-136	C38			C62		
12	R46	30.9	-269	R94	1.27	-136	C46			C70		
13	R39	30.9	-269	R87	1.27	-136	C39			C63		
14	R47	30.9	-269	R95	1.27	-136	C47			C71		
15	R40	26.7	-263	R88	1.27	-136	C40			C64		
16	R48	26.7	-263	R96	1.27	-136	C48	0		C72	0	

DESIGN ENGINEER Keith C. Lauder III

EQUIPMENT USED MODEL SERNO CAL DUE DATE

1)
2)
3)
4)
5)
6)
7)
8)
9)
10)

1 / 118 VERIFY RESISTORS INSTALLED ON STANDOFFS AS RECORDED ABOVE, AND THAT THEY ARE FROM THE APPROPRIATE SELECT LIST
2/17/82

SIZE	CODE IDENT NO	NUMBER
A	11323	
SCALE	REV C	SHEET 40

ORIGINAL PAGE IS
OF POOR QUALITY

POST THERMAL CYCLE
RADIOMETRIC TEST

BAND 6
RADIOMATRIC

TEST SHEET 12
SHEET 2 OF 3

SIGNAL/NOISE

CFPA SERNO 201 BAND 6 PREAMP SERNO 101 DATE: FEB. ~~18~~ 19, 1982

BAND 6 POST AMP SERNO 201

T1 READING .976 VOLTS= 91.0 °K

T2 READING .976 VOLTS= 91.0 °K

TEST ENGINEER
N. C. DAVISON, III

CHANNEL	PREAMP OUTPUT SIGNAL	PREAMP OUTPUT NOISE	PREAMP OUTPUT BROAD BAND NOISE	POST AMP OUTPUT SIGNAL	POST AMP OUTPUT NOISE	POST AMP OUTPUT BROAD BAND NOISE	CALCULATIONS MAX $\le .93 \times 10^{-10}$ NEP λ	CALCULATIONS MIN $\ge$ 3200 V/W R λ	POST AMP. GAIN
(scale)	.2 mV	200 μV	200 μV	50 mV	5 mV	2 mV			
SCOPE GAIN =	X245	X2483	X2483	984	X98.6	X245	← SCOPE GAIN		
1	786 mV	4.3 mV/√Hz	.57 V	560 mV	3.0 mV/√Hz	.88 V	$.37 \times 10^{-10}$	11.5 K	17.4
2	576	4.4 mV/√Hz	.56 V	582	4.1	1.23 V	$.50 \times 10^{-10}$	7.9 K	24.9
3	808	4.8 mV/√Hz	.59 V	577	3.0	.93 V	$.38 \times 10^{-10}$	11.7 K	17.7
4	561 mV	4.3 mV/√Hz	.57	565	4.1 mV/√Hz	1.23 V	$.51 \times 10^{-10}$	7.7 K	24.8

POST AMP GAIN: SEE ABOVE
APERTURE TO FILTER = 18.1 cm.
DETECTOR AREA = 4.3×10^{-4} cm²
H_0^{∞} = 3.1×10^{-5} W/cm²
BLACKBODY TO λ = 22.7
BLACKBODY TEMPERATURE = 800 K

	CH.1	CH.2	CH.3	CH.4
PREAMP GAIN =	485	510	482	511

NOISE CORRECTION FACTOR 1.0
BANDWIDTH = .13 ~~KHz~~
APERTURE DIAMETER = .257 cm
SCOPE GAIN SEE ABOVE

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1) SCOPE	TEK 7603	G-456991	3 MAR. 1982
2) SPEC. AN.	HP 3582A	803396	30 APRIL 1982
3) RMS METER	HP 3400A	803266	18 JUNE 1982
4) P/S	HP 6255A	457602	3-5-82 (NCR)
5)			
6)			
7)			
8)			

QA ENGINEER ACCEPT 18 2/23/82

DESIGN ENGINEER [signature] III

SIZE	CODE IDENT NO	NUMBER
A	11323	16192
SCALE	REV 3	SHEET 43

PER TEST FMR 50973
OPERATION 2600

BAND 6
RADIOMATRIC

SIGNAL/NOISE

CFPA SERNO 201 BAND 6 PREAMP SERNO 101 DATE: FEB. 17, 1982

BAND 6 POST AMP SERNO 201

T1 READING .976 VOLTS= 91.0 °K

T2 READING .976 VOLTS= 91.0 °K

TEST ENGINEER C. R. Lane

	2 mV	200 µV	200 µV	50 mV	5 mV	2 mV			
SCOPE GAIN ==	X245	X2483	X2483	9.84	X98.6	X245			
	PREAMP OUTPUT			POST AMP OUTPUT			CALCULATIONS		
CHANNEL	SIGNAL	NOISE	BROAD BAND NOISE	SIGNAL	NOISE	BROAD BAND NOISE	MAX $\leq .93 \times 10^{-10}$ NEP λ	MIN ≥ 3200 V/W R λ	POST AMP. GAIN
1	848 mV	4.2 mV/√HZ	.59 V	604 mV	3.0 mV/√HZ	.88 V	$.34 \times 10^{-10}$	12.4×10^{8}	17.4
2	609	4.2	.58 V	613	4.0	1.25 V	$.48 \times 10^{-10}$	8.4	24.9
3	852	4.2	.61 V	609	3.3	.93	$.36 \times 10^{-10}$	12.4	17.7
4	604 mV	4.2 mV/√HZ	.58 V	611	4.1 mV/√HZ	1.25 V	$.48 \times 10^{-10}$	8.3	24.8

POST AMP GAIN : SEE ABOVE
APERTURE TO FILTER = 18.1 cm
DETECTOR AREA = 4.3×10^{-4} cm^2
H_0^{∞} = 3.1×10^{-5} W/cm^2
BLACKBODY TO λ = 22.7
BLACKBODY TEMPERATURE = 800K

	CH.1	CH.2	CH.3	CH.4
PREAMP GAIN =	485	510	482	511

NOISE CORRECTION FACTOR : 1.0
BANDWIDTH = 6 HZ + 52 KHZ
APERTURE DIAMETER = .257 cm
SCOPE GAIN : SEE ABOVE

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1) SCOPE:	TEK 7603	G-456791	3 MAR 1982
2) SPEC. ANAL.	H.P. 3582A	803396	30 APRIL 1982
3) RMS METER	HP 3400A	803266	18 JUNE 1982
4) P/S	HP 6255A	457602	3-5-82
5)			
6)			
7)			
8)			

QA ENGINEER I 118 ACCEPT 2/18/82

DESIGN ENGINEER [signature] JR

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
SCALE	REV 3		SHEET 43

FREQUENCY RESPONSE BAND 6 DATE FEB.

CFPA SERNO 201 BAND 6 PREAMP SERNO 101

BAND 6 POST AMP SERNO 201

T1 READING .974 VOLTS = 91.9 °K

T2 READING .974 VOLTS = 91.9 °K

TEST ENGINEER
N. C. DAVISON, III

CURRENT +19VDC= .070 AMPS, -19VDC .072 AMPS
150 mA MAX 150mA MAX

1 / 118 REVIEW 2/1982

EQUIPMENT USED:	MODEL	SERNO	CAL DUE DATE
	1) Scope 7603	G.S-11	3 MAR 1982
	2) Analyzer	G 457542	17 FEB 1982
	3) Synthesizer	803412 (G 457543)	17 FEB 1982
	4)		
	5)		
	6)		
	7)		
	8)		

ORIGINAL PAGE IS
OF POOR QUALITY

FREQUENCY RESPONSE BAND 6 (Continued)

CHANNEL	3db POINT 13KHz±2KHz	RISE TIME 80μS MAX	SETTLING TIMES @ 120μS 1.5% MAX	SETTLING TIMES @ 240μS 1% MAX	OVER-SHOOT 10% MAX	TIME DELAY ~~(nS)~~ μSec Leading	TIME DELAY ~~(nS)~~ μSec Trailing	DROOP 0.4% MAX	R41 VALUE 908 No.	R44 VALUE 908 No.
1	11.3KHz	55μSec				30	38		—	—
2	11.0KHz	55μSec				30	38		—	—
3	11.4KHz	55μSec				30	38		—	—
4	11.2KHz	55μSec				30	38	/	—	—

TIME DELAY - ALL READINGS IN THESE COLUMNS HAVE TO BE WITHIN ± 0.5 μs OF EACH OTHER.

PREAMP OUTPUT

POST AMP RESP @ 13KHz
13KHz CH. 1 -2.6dB
13KHz CH. 2 -2.7dB
13KHz CH. 3 -2.6dB
13KHz CH. 4 -2.6dB

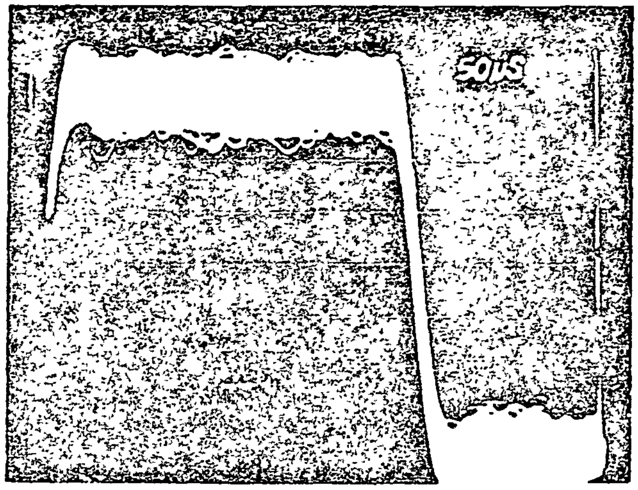
	VALUE	PART NO. 908600-
R1		
R2		
R3		
R4		
R5		
R6		
R7		
R8		
R21		
R22		
R23		
R24		

Test Engineer N. C. Davison, III
Date FEB. 11, 1982
Design Engineer [signature]
Date FEB. 11, 1982
Q. A. ~~[illegible]~~, rise time, and delay time differences call 1/19/82 T postamp freq. resp. [illegible]
Date 3/19/82

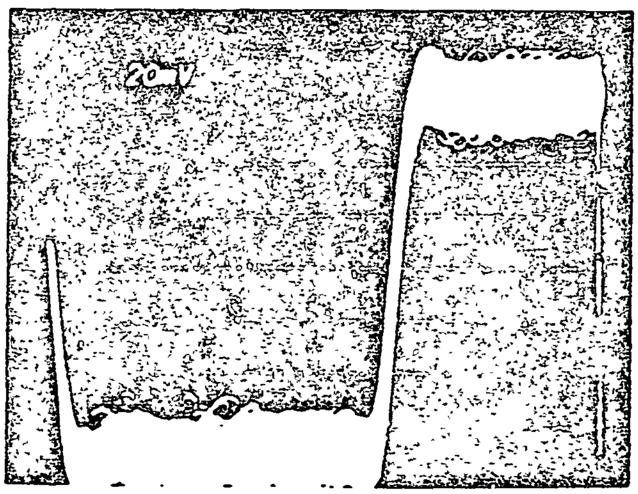
~~[illegible]~~ settling time ~~and~~ and overshoot data missing 2/22/82

SIZE	CODE IDENT NO	NUMBER
A	11323	16192
SCALE	REV C	SHEET 44

BAND 6 TRANSIENT RESPONSE



CHANNEL 1

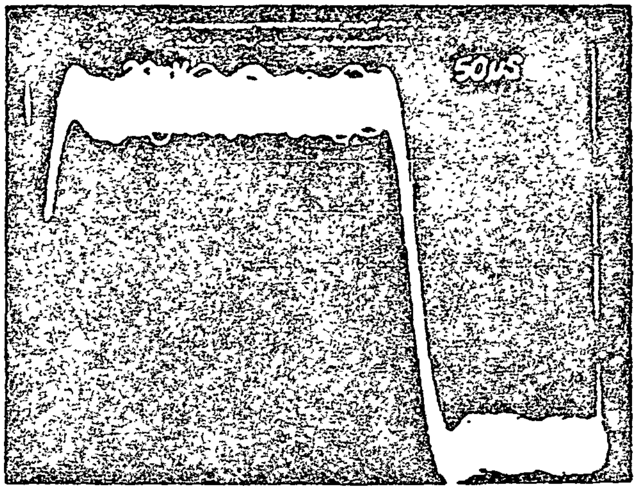


CHANNEL 1

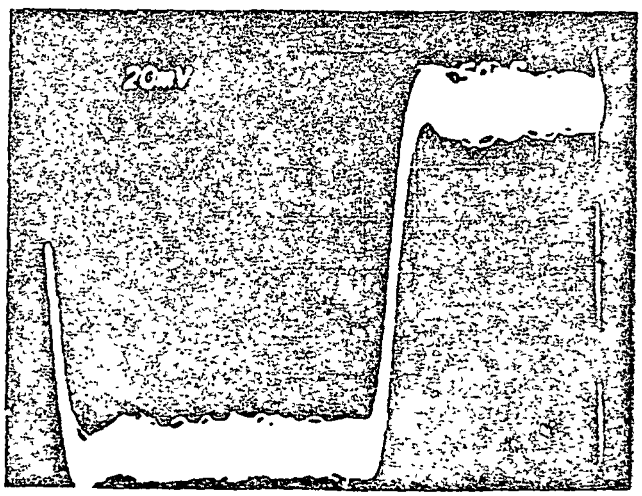
I REVIEW 2/22/82

N. C. DAVISON, III
FEB. 11, 1982

BAND 6 TRANSIENT RESPONSE



CHANNEL 2



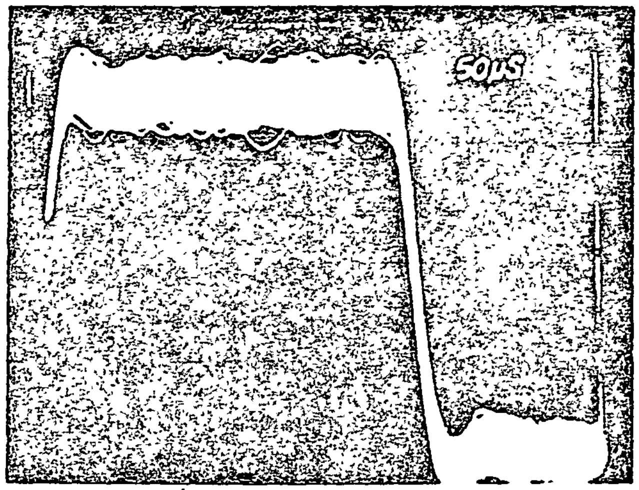
CHANNEL 2

REVIEW
2/22/92

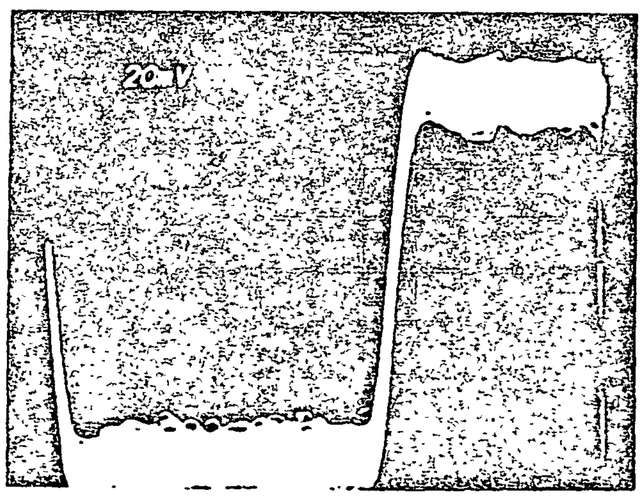
N. C. DAVISON, III
FEB. 11, 1982

ORIGINAL PAGE IS
OF POOR QUALITY

BAND 6 TRANSIENT RESPONSE



CHANNEL 3



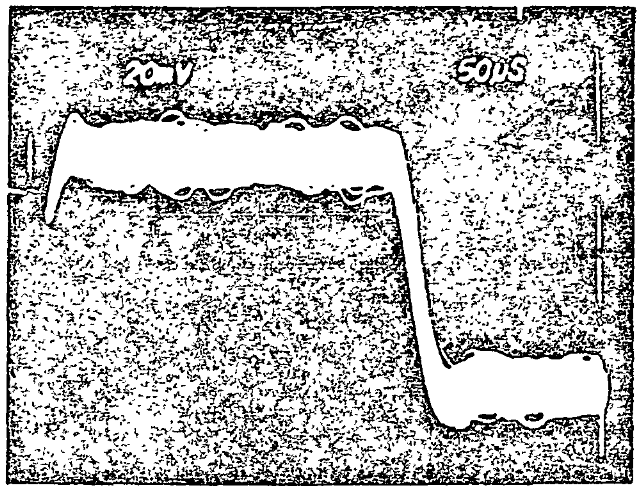
CHANNEL 3

REVIEW
2/22/82

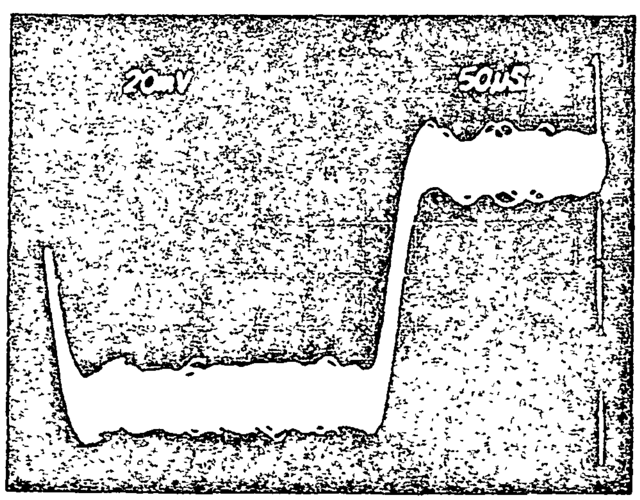
N. C. DAVISON, III
FEB. 11, 1982

ORIGINAL PAGE IS
OF POOR QUALITY

BAND 6 TRANSIENT RESPONSE



CHANNEL 4



CHANNEL 4

REVIEW
2/23/82

N. C. DAVISON, III
FEB. 11, 1982

F-1 CFPA

BAND 6
CH. 1

PREAMP
RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

N.C. DAVISON, III
FEB. 12, 1982

I 118 REVIEW 2/16/82

F-1 CFPA

BAND 6
CH. 2

PREAMP
RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
    q=     [illegible]          [illegible]          16496.43
    l=        -0.51       ampl=    -1.7[illegible]   ampl=    -4.93
   ,l                     fail                       fail
    q=      4061.59       freq=     8185.47          freq=  17243.25
ampl=         -0.55       ampl=       -1.90          ampl=     -5.24
fail                      fail                       fail
freq=       4370.07       freq=     8605.63          freq=  18233.48
ampl=         -0.61       ampl=       -2.05            pl=     -5.54
fail                      fail                         il
freq=       4489.15       freq=     9047.33           eq=   19165.41
ampl=         -0.66       ampl=       -2.19           mpl=     -5.85
fail                      fail
freq=       4719.69       freq=     9511.73
ampl=         -0.74       ampl=       -2.36
fail                      fail
freq=       4961.95       freq=    10513.36
ampl=         -0.80       ampl=       -2.76
fail                      fail
freq=       5215.55       freq=    11052.45
ampl=         -0.83       ampl=       -2.99
fail                      fail
freq=       5484.42       freq=    11620.20
ampl=         -0.98       ampl=       -3.22
fail                      fail
freq=       5765.93       freq=    12216.77
ampl=         -1.03       ampl=       -3.43
fail                      fail
freq=       6061.90       freq=    12843.86
ampl=         -1.14       ampl=       -3.65
fail                      fail
freq=       6373.06       freq=    13503.14
ampl=         -1.26       ampl=       -3.89
fail                      fail
freq=       6700.19       freq=    14156.26
   pl=        -1.36           l=      -4.15
   il                         l
   eq=      7044.11           q=    14924.95
   pl=        -1.53           l=      -4.43
   l                          l
   e =      7405.68           q=    1[illegible]
              -1.61           l=
```

N.C. DAVISON, III
FEB. 12, 1982

REVIEW 2/18/82

F-1 CFPA BAND 6 CH. 3 PRE AMP RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
freq=   [illegible]
ampl=   -0.[illegible]
fail
freq=   49[illegible]
ampl=   -0.[illegible]
fail
freq=   52[illegible]
ampl=   -0.7[illegible]
fail
freq=   5454.42
ampl=   -0.90
fail
freq=   5765.92
ampl=   -0.99
fail
freq=   6061.90
ampl=   -0.98
fail
freq=   6373.06
ampl=   -1.07
fail
freq=   6720.19
ampl=   -1.21
fail
freq=   7044.11
ampl=   -1.33
fail
freq=   7405.68
ampl=   -1.41
fail
freq=   7765.82
ampl=   -1.59
fail
freq=   8135.47
ampl=   -1.7[illegible]
fail
freq=   8525.[illegible]
ampl=   -1.83
fail
freq=   8947.35
ampl=   -2.[illegible]

fail
freq=   [illegible]
ampl=   -2.1[illegible]
fail
freq=   10[illegible]
ampl=   -2.5[illegible]
fail
freq=   11051.55
ampl=   -2.81
fail
freq=   11420.30
ampl=   -3.01
fail
freq=   12216.77
ampl=   -3.15
fail
freq=   12643.56
ampl=   -3.49
fail
freq=   13593.14
ampl=   -3.73
fail
freq=   14156.22
ampl=   -4.04
fail
freq=   14824.55
ampl=   -4.28
fail
freq=   15531.06
ampl=   -4.58
fail
freq=   16495.48
ampl=   -4.86
fail
freq=   17343.25
ampl=   -5.16
fail
freq=   18233.42
ampl=   -5.47
fail
freq=   19163.41
ampl=   -5.7[illegible]
```

N.C. DAVISON, III
FEB. 11, 1982

I 118 REVIEW 2/18/82

F-1 CFPA BAND 6 CH. 4 PREAMP RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
        4270.07
          -0.56
fail
freq=   4489.25
ampl=     -0.63
fail
freq=   4719.69
ampl=     -0.72
fail
freq=   4961.95
ampl=     -0.76
fail
freq=   5216.65
ampl=     -0.88
fail
freq=   5484.42
ampl=     -0.95
fail
freq=   5765.93
ampl=     -1.01
fail
freq=   6061.90
ampl=     -1.07
fail
freq=   6373.06
ampl=     -1.20
fail
freq=   6700.19
ampl=     -1.34
fail
freq=   7044.11
ampl=     -1.44
fail
freq=   7405.68
ampl=     -1.59
fail
freq=   7785.82
ampl=     -1.73
fail
freq=   8185.47
ampl=     -1.84
```

```
        8605.63
ampl=     -2.01
fail
freq=   9047.36
ampl=     -2.16
fail
        9511.76
          -2.36
       10513.30
ampl=     -2.70
fail
freq=  11052.95
ampl=     -2.94
fail
freq=  11620.30
ampl=     -3.14
fail
freq=  12216.77
ampl=     -3.36
fail
freq=  12843.86
ampl=     -3.58
fail
freq=  13503.14
ampl=     -3.88
fail
freq=  14196.26
ampl=     -4.09
fail
freq=  14924.96
ampl=     -4.37
fail
freq=  15691.06
ampl=     -4.61
fail
freq=  16496.48
ampl=     -4.91
fail
freq=  17343.25
ampl=
```

```
         18233.
ampl=       -5.
fail
freq=    19169.
            -5.
```

N.C. DAVISON, III
FEB. 12, 1982

I 118 REVIEW 2/16/82

F-1 CFPA

BAND 6
CH. 1

POST AMP
RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
fail
freq=   [illegible]
ampl=        -0.54
fail
freq=      5434.42
ampl=        -0.51
fail
freq=      5765.91
ampl=   [illegible]
fail
freq=      6061.33
ampl=        -0.52
fail
freq=      6373.25
ampl=        -0.55
fail
freq=      6703.15
ampl=        -0.62
fail
freq=      7044.11
ampl=        -0.71
fail
freq=      7405.66
ampl=        -0.79
fail
freq=      7765.22
ampl=        -0.82
fail
freq=      8165.47
ampl=        -0.87
fail
freq=      8605.63
ampl=        -1.01
fail
freq=   [illegible]
ampl=        -1.05
fail
freq=      9511.76
ampl=        -1.13
```

```
fail
freq=     10511.33
ampl=        -1.43
fail
freq=     11051.95
ampl=   [illegible]
fail
freq=     11620.30
ampl=   [illegible]
fail
freq=     12216.77
ampl=        -2.23
fail
freq=     12843.94
ampl=        -2.73
fail
freq=     13503.14
ampl=        -3.25
fail
freq=   [illegible]
ampl=   [illegible]
fail
freq=     14914.55
ampl=        -4.41
fail
freq=     15681.86
ampl=        -5.24
fail
freq=     16496.42
ampl=        -6.14
fail
freq=     17341.25
ampl=   [illegible]
fail
freq=     18233.49
ampl=   [illegible]
fail
freq=   [illegible]
ampl=   [illegible]
```

N.C. DAVISON, III
FEB. 12, 1982
I/118 REVIEW 2/16/82

F-1 CFPA

BAND 6
CH. 2

POST AMP
RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
foil
freq=     7044.11
ampl=       -0.53
foil
freq=     7405.66
ampl=       -0.63
foil
freq=     7785.92
ampl=       -0.64
foil
freq=     8185.47
ampl=       -0.77
foil
freq=     8605.63
ampl=       -0.94
foil
freq=     9047.36
ampl=       -0.94
foil
freq=     9511.73
ampl=       -1.07
```

```
foil
freq=     105[illegible]
ampl=       -1.35
foil
freq=    11052.95
ampl=       -1.53
foil
freq=    11620.33
ampl=       -1.77
foil
freq=    12216.77
ampl=       -2.17
foil
freq=    12843.85
ampl=       -2.51
foil
freq=    13502.14
ampl=       -3.09
foil
freq=    14195.36
ampl=       -3.74
foil
freq=    14924.96
ampl=       -4.36
foil
freq=    15691.26
ampl=       -5.20
foil
freq=    16496.42
ampl=       -6.07
foil
freq=    17343.35
ampl=       -7.07
foil
freq=    18233.43
ampl=       -8.13
foil
f
c
```

N. C. DAVISON, III
FEB. 12, 1982

I 118 REVIEW 2/15/82

F-1 CFPA

BAND 6
CH. 3

POST AMP
RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
foil
freq=    [illegible]
ampl=      -0.53
foil
freq=    9047.[illegible]
ampl=      -0.[illegible]
foil
freq=    9511.7[illegible]
ampl=      -0.76
foil
freq=   10513.60
ampl=      -1.07
foil
freq=   11052.95
ampl=      -1.27
foil
freq=   11620.30
ampl=      -1.54
foil
freq=   12216.77
ampl=      -1.94
foil
freq=   12843.85
ampl=      -2.25
foil
freq=   13503.14
ampl=      -2.69
foil
freq=   14195.26
ampl=      -3.27
foil
freq=   14924.96
ampl=      -3.[illegible]
foil
freq=   15691.05
ampl=      -4.[illegible]
foil
freq=   16496.48
ampl=      -5.53
foil
freq=   17343.15
ampl=      -6.43
foil
freq=   18233.45
ampl=      -7.55
foil
        [illegible]
```

N. C. DAVISON, III
FEB. 12, 1982

I 118 REVIEW 2/18/82

F-1 CFPA

BAND 6
CH. 4

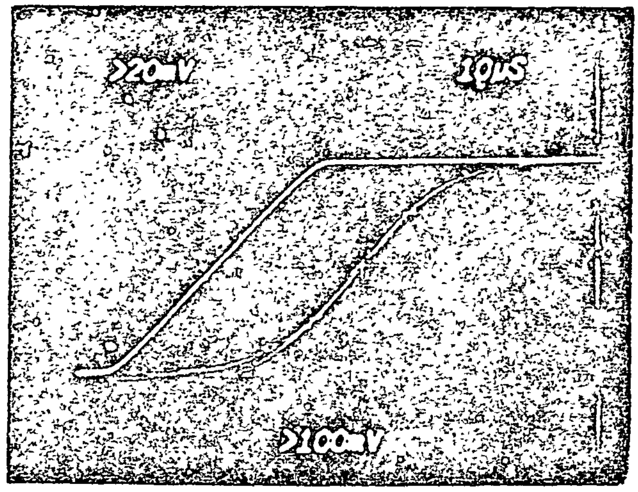
POST AMP
RESPONSE

ORIGINAL PAGE IS
OF POOR QUALITY

```
fail
freq=   [illegible]
ampl=     -0.56
fail
freq=   [illegible]
ampl=     -0.65
fail
freq=    9047.36
ampl=     -0.70
fail
freq=    9511.76
ampl=     -0.39
fail
freq=   10513.30
ampl=     -1.14
fail
freq=   11052.95
ampl=     -1.32
fail
freq=   11620.39
ampl=     -1.57
fail
freq=   12216.77
ampl=     -1.92
fail
freq=   12843.86
ampl=     -2.22
fail
freq=   13503.14
ampl=     -2.75
fail
freq=   14196.26
ampl=     -3.32
fail
freq=   14924.94
ampl=     -4.26
fail
freq=   15691.06
ampl=     -4.96
fail
freq=   16495.46
ampl=     -5.74
fail
freq=   17341.25
ampl=   [illegible]
fail
freq=   [illegible]
ampl=   [illegible]
fail
freq=   [illegible]
ampl=   [illegible]
```

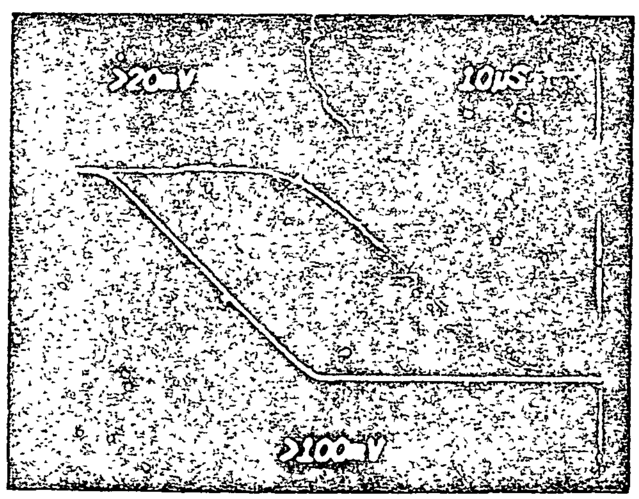
N. C. DAVISON, III
FEB. 12, 1982
I REVIEW 118 2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 6
CHANNEL 1

DELAY TIME
30 μSec



BAND 6
CHANNEL 1

DELAY TIME
38 μSec

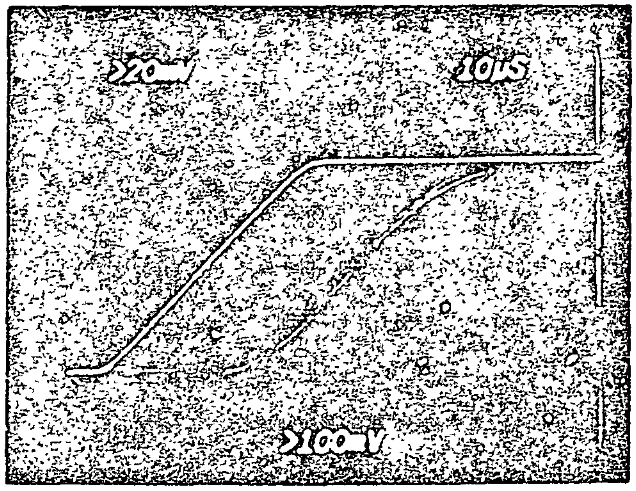
N. C. Davison

DATE: FEB. 11, 1982

VERIFY
118
2/16/82

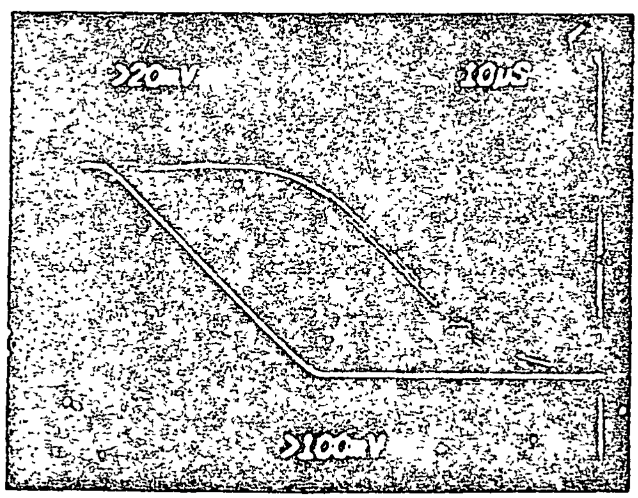
C-5

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 6
CHANNEL 2

DELAY TIME
30 µSec



BAND 6
CHANNEL 2

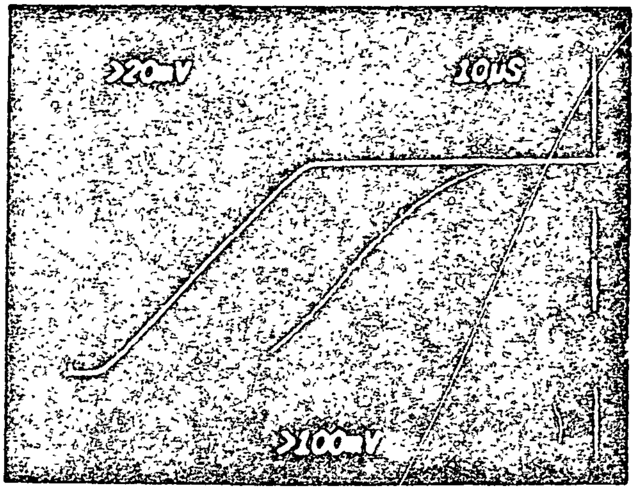
DELAY TIME
38 µSec

N.C. DAVISON

DATE: FEB. 11, 1982

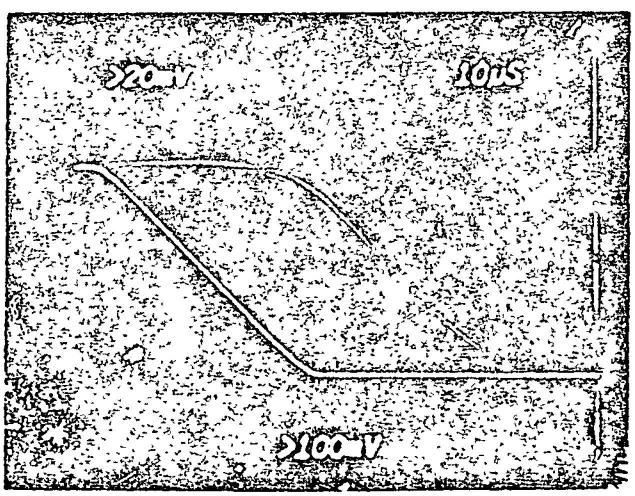
I 118 VERIFY 2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 6
CHANNEL 3

DELAY TIME
30 μSec



BAND 6
CHANNEL 3

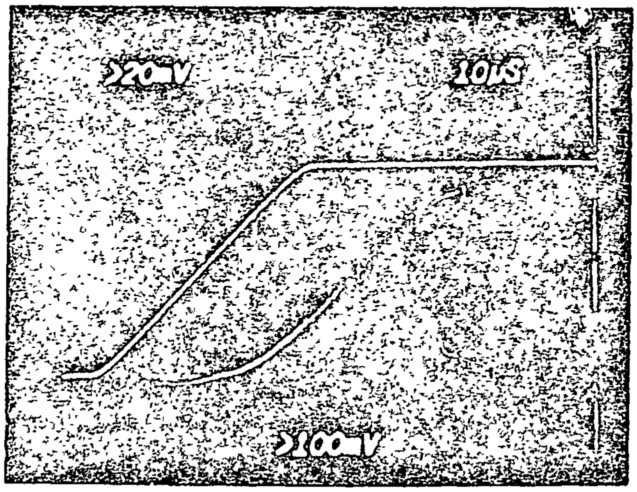
DELAY TIME
38 μSec

N.C. Davison

DATE: FEB. 11, 1982

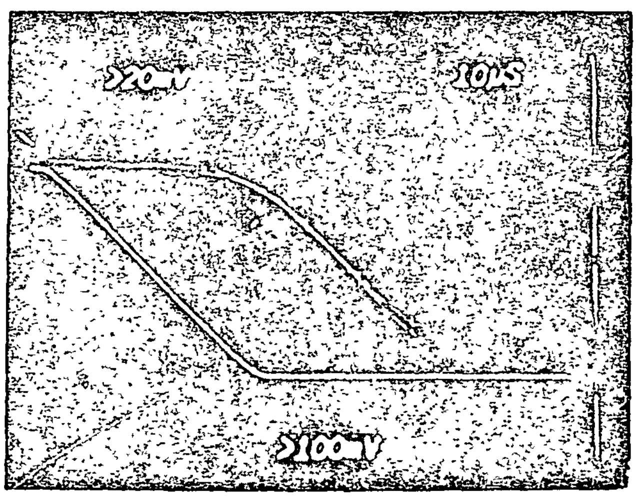
VERIFY 2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 6
CHANNEL 4

DELAY TIME
30 μSec



BAND 6
CHANNEL 4

DELAY TIME
38 μSec

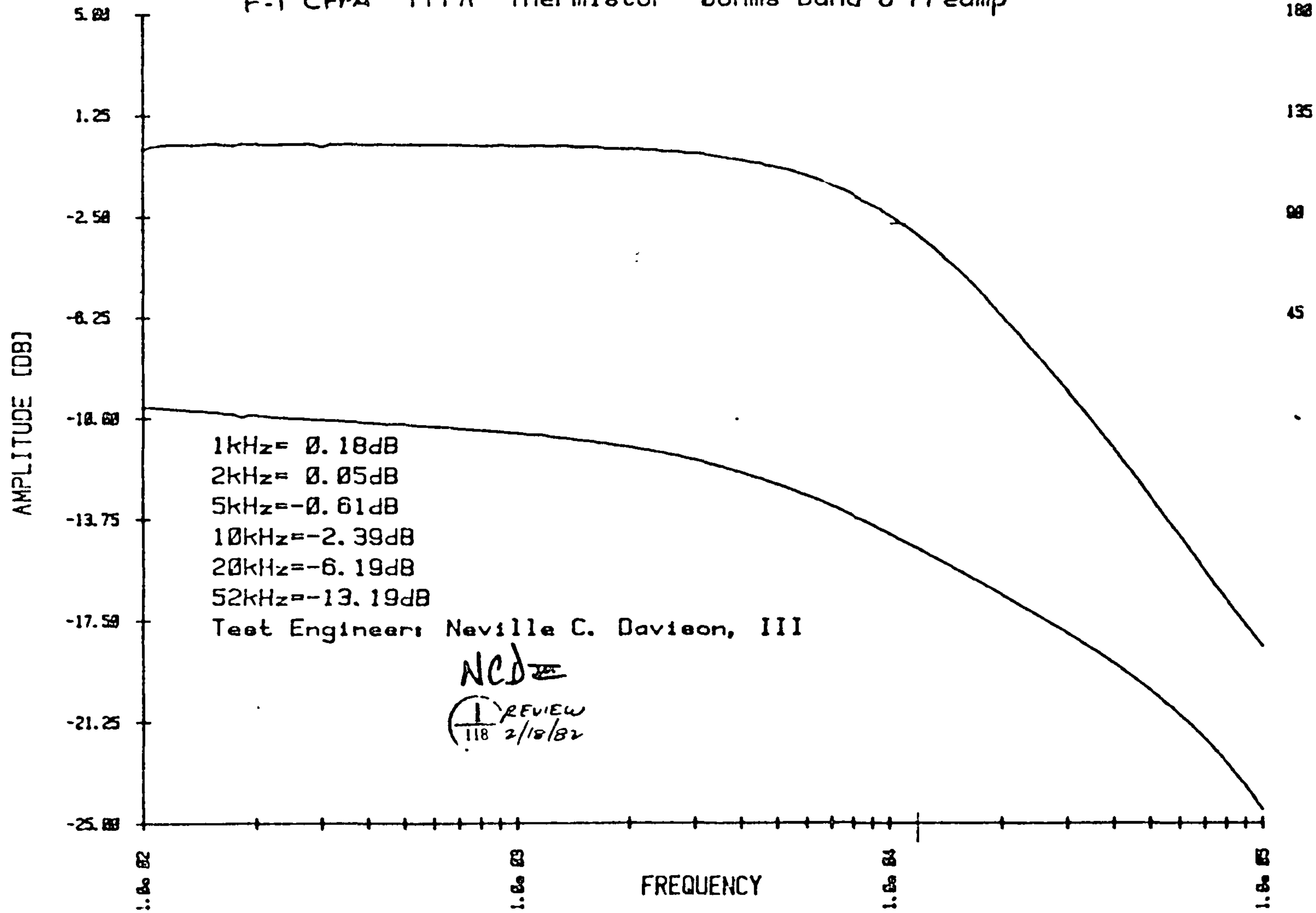
M.C. Davison

DATE: FEB. 11, 1982

VERIFY
2/18/82

BAND 6 CHANNEL 1 Feb. 11, 1982

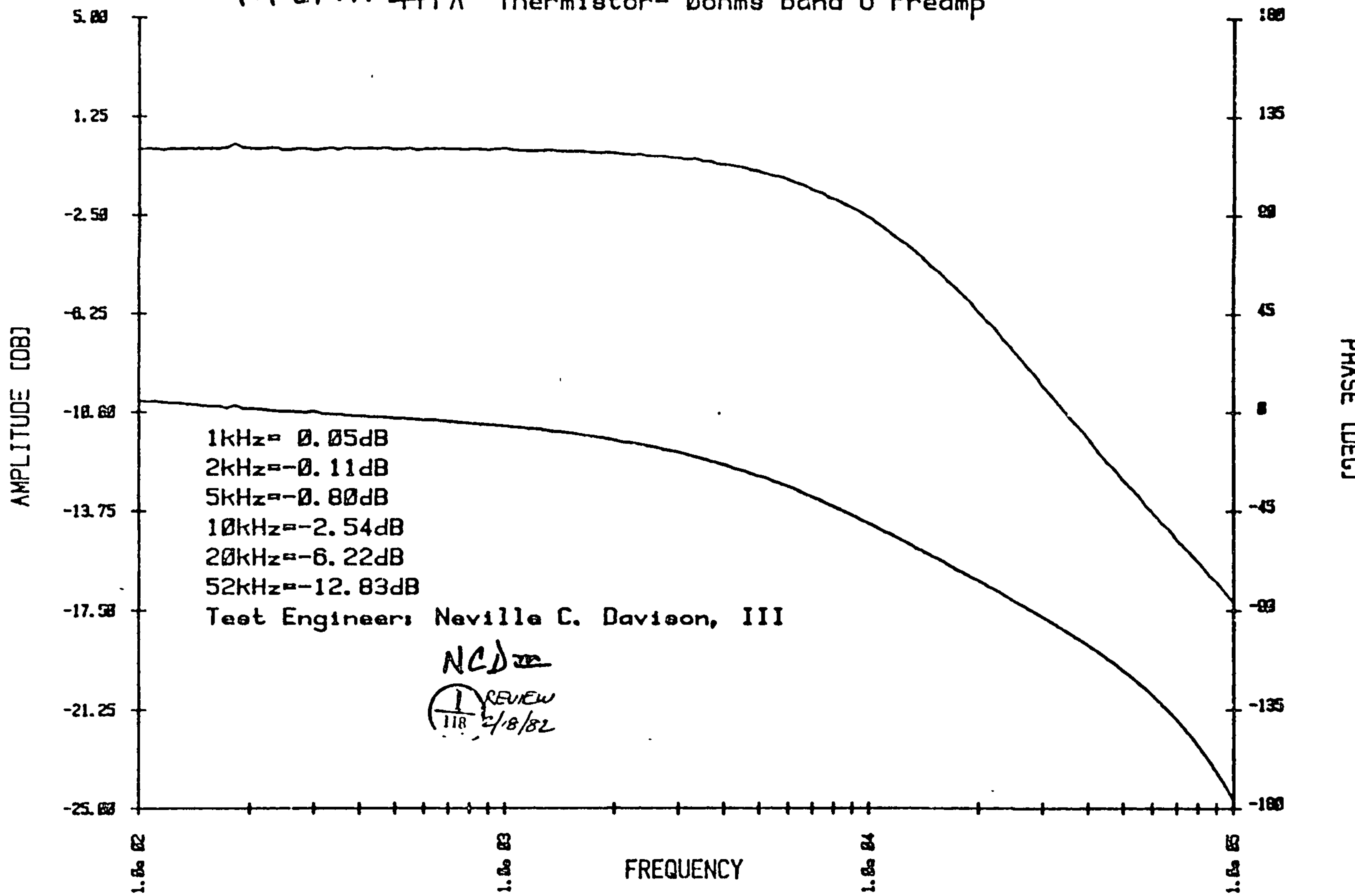
F-1 CFPA ~~PFPA~~ Thermistor= Øohms Band 6 Preamp



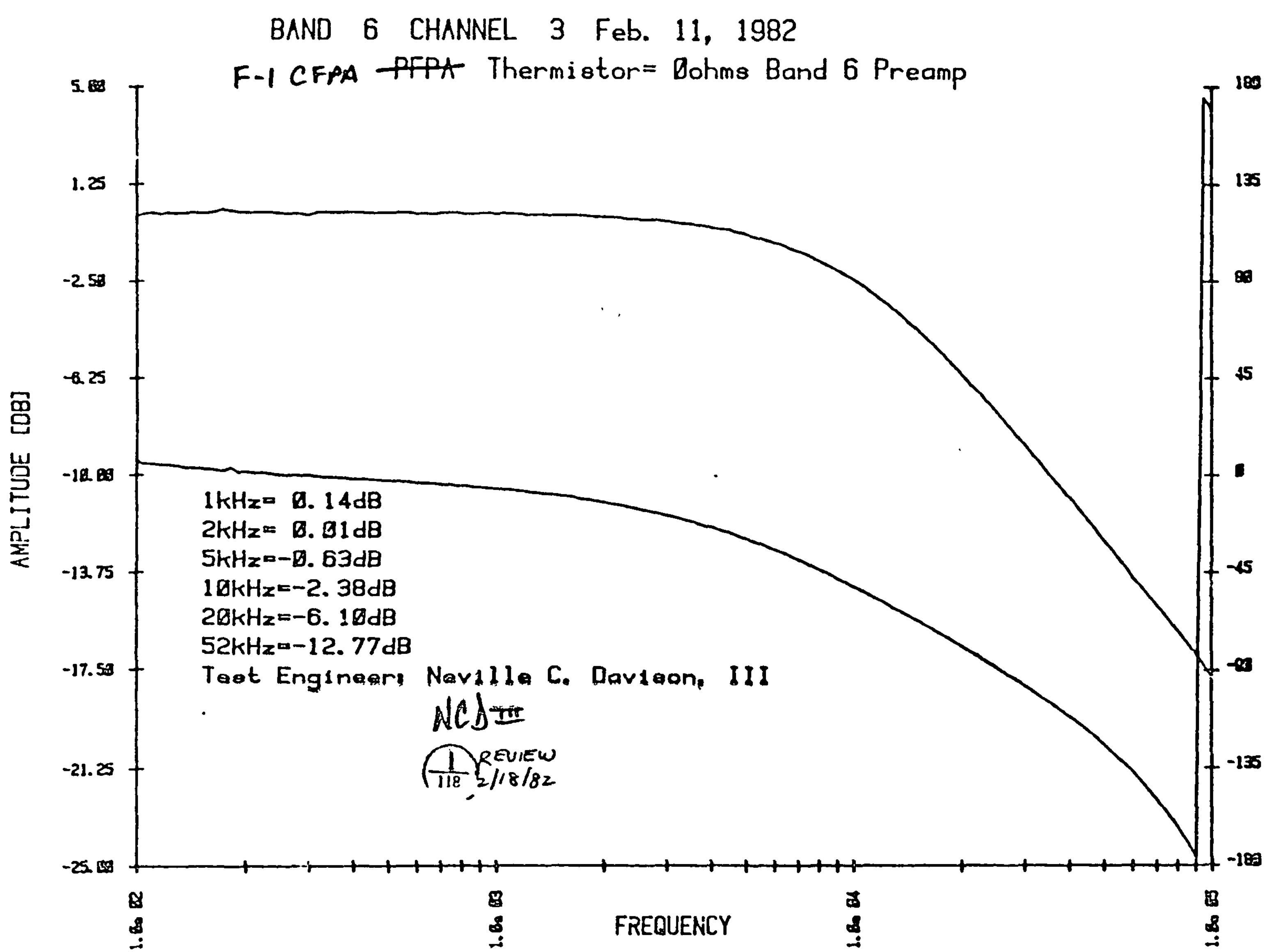
ORIGINAL PAGE IS OF POOR QUALITY

BAND 6 CHANNEL 2 Feb. 11, 1982

F-1 CFPA ~~PFPA~~ Thermistor= Øohms Band 6 Preamp



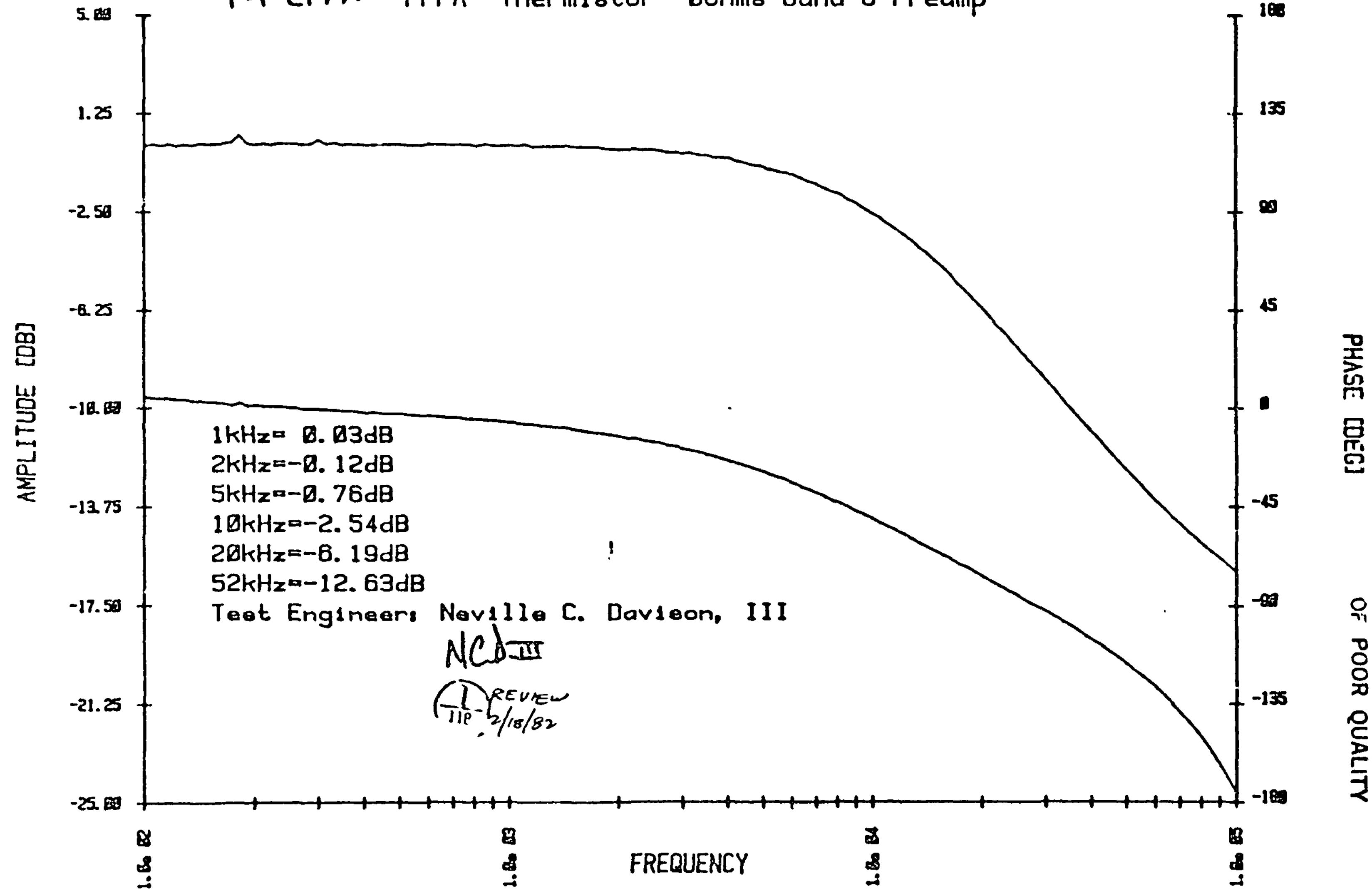
ORIGINAL PAGE IS
OF POOR QUALITY



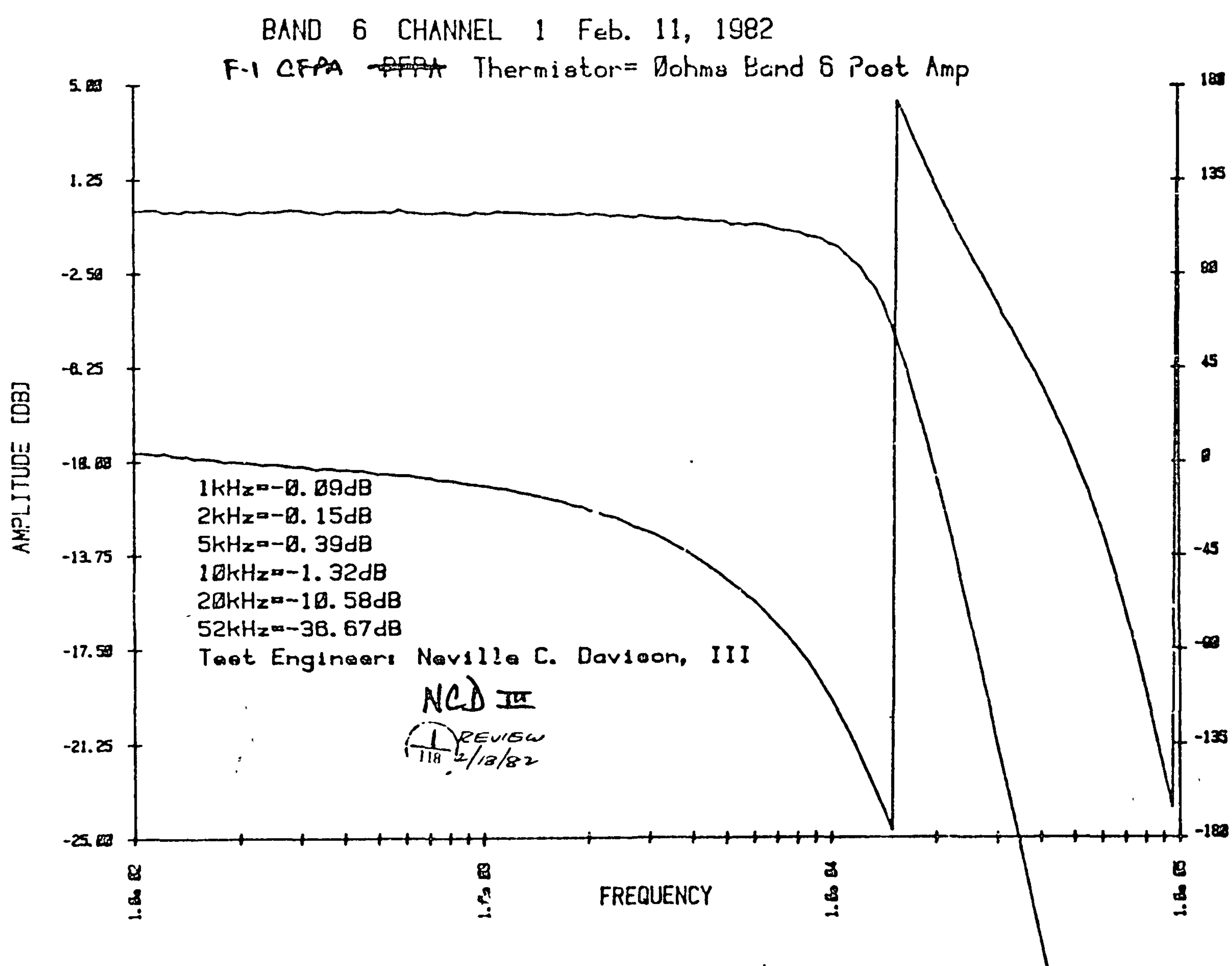
ORIGINAL PAGE IS OF POOR QUALITY

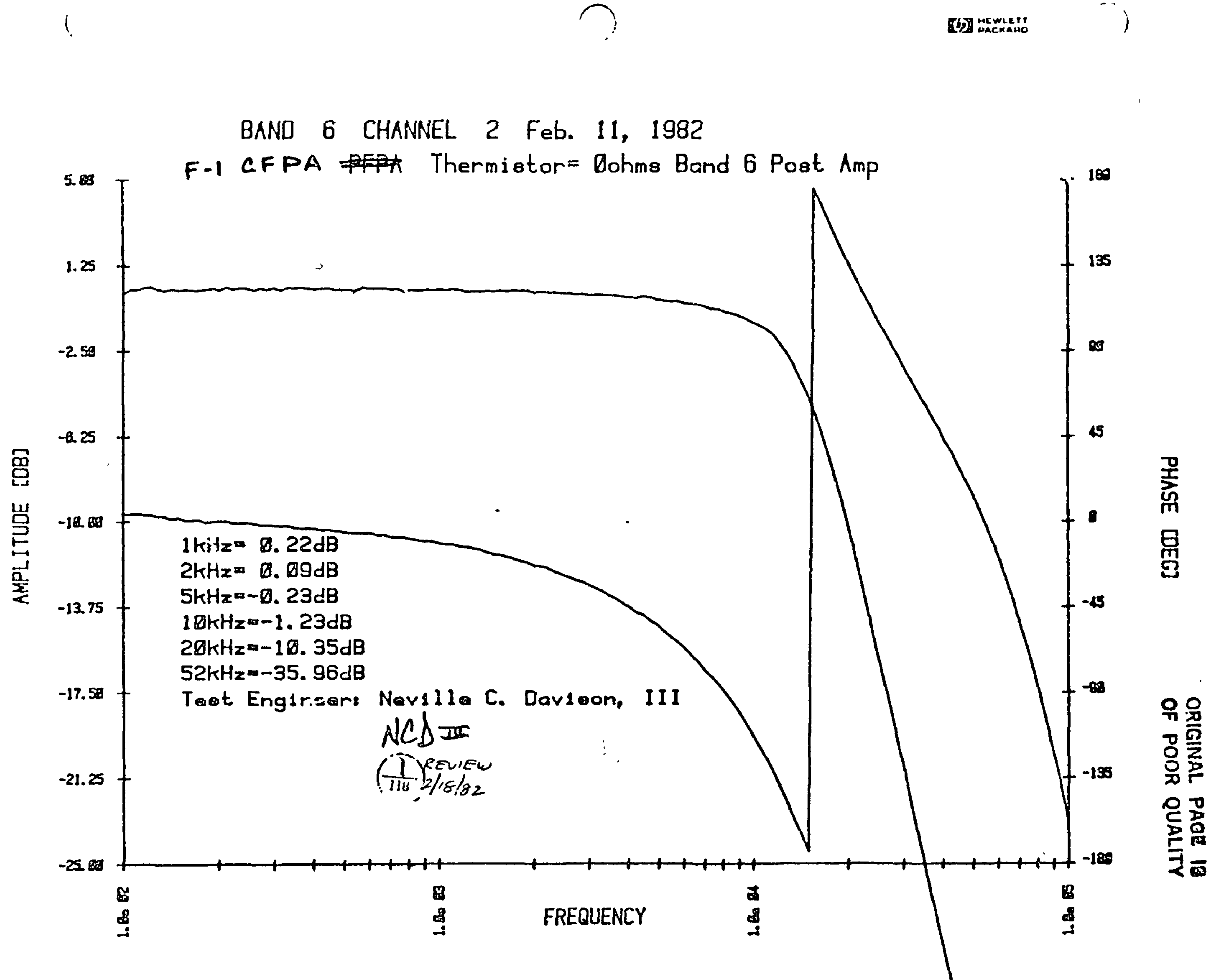
BAND 6 CHANNEL 4 Feb. 11, 1982

F-1 CFPA ~~PFPA~~ Thermistor= Øohms Band 6 Preamp



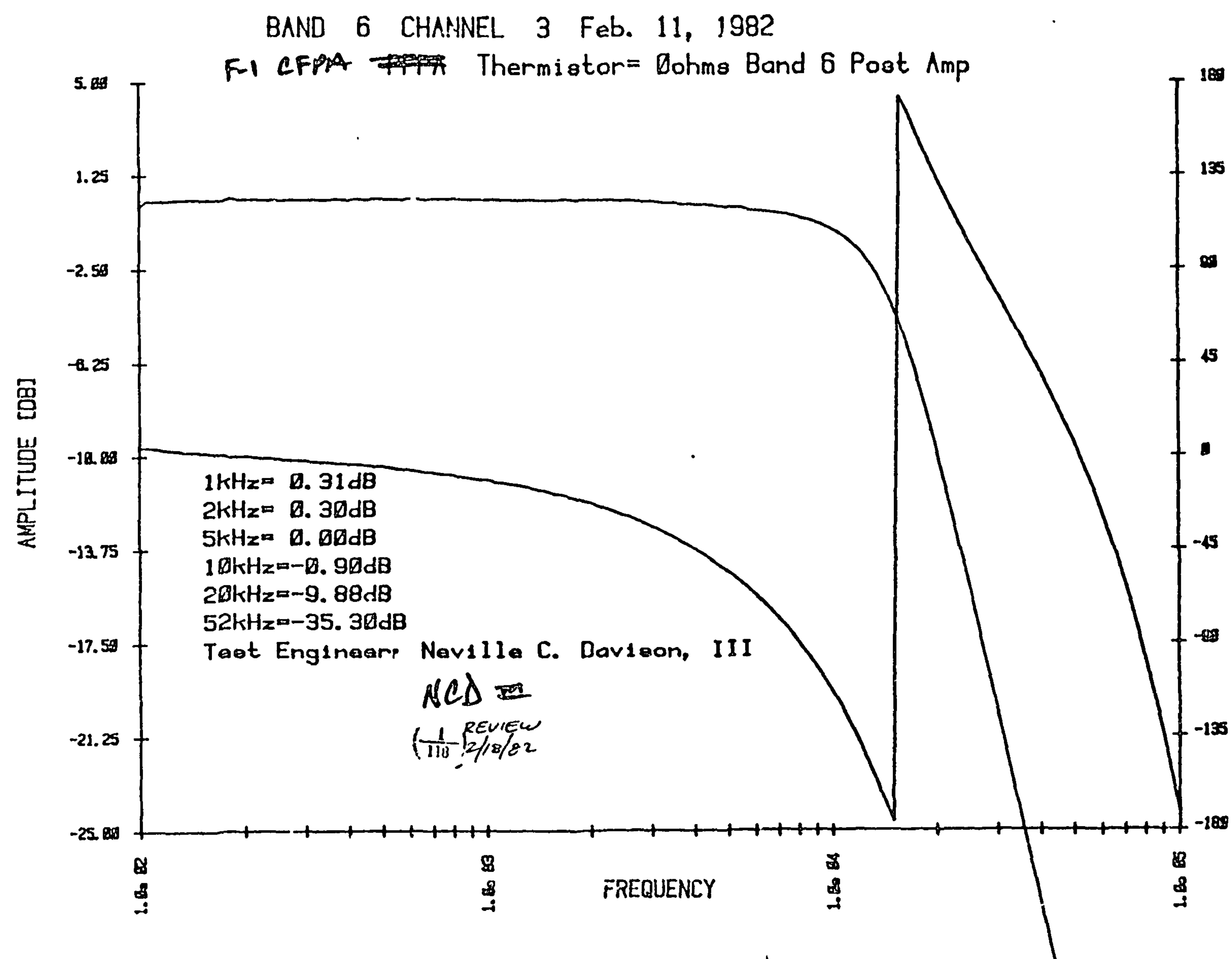
ORIGINAL PAGE IS
OF POOR QUALITY


HEWLETT PACKARD
BAND 6 CHANNEL 1 Feb. 11, 1982
F-1 CFPA ~~PFPA~~ Thermistor= Øohms Band 6 Post Amp
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
FREQUENCY
1.0e 02
1.0e 03
1.0e 04
1.0e 05
1kHz=-0.09dB
2kHz=-0.15dB
5kHz=-0.39dB
10kHz=-1.32dB
20kHz=-10.58dB
52kHz=-36.67dB
Test Engineer: Neville C. Davison, III
NCD III
REVIEW 2/18/82



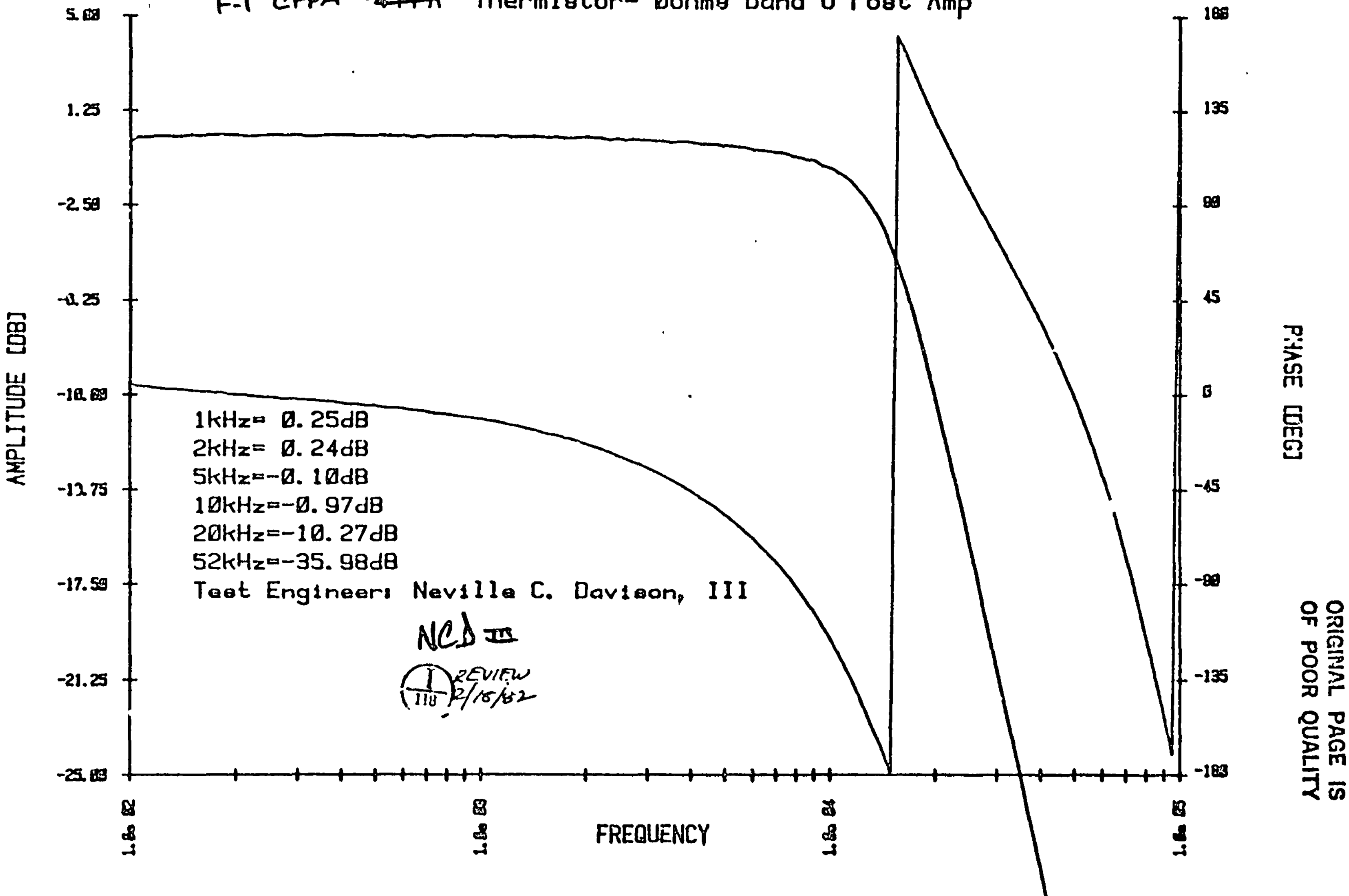
ORIGINAL PAGE IS OF POOR QUALITY

ORIGINAL PAGE IS OF POOR QUALITY



BAND 6 CHANNEL 4 Feb. 11, 1982

F-1 CFPA ~~DFPA~~ Thermistor= Øohms Band 6 Post Amp



ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

Flight

TEST SHEET 2

HEATER/SENSOR AND BAND 6 OHMIC CHECK

CFPA SERNO 201

DATE 13 Dec 81

T1 READING .972 VOLTS = _____ °K

T2 READING .971 VOLTS = _____ °K

TEST ENGINEER
Robert C. Anderson

BAND 6

CHANNEL	LIMITS OHMS	READING	COMMENTS
1	25 TO 100	43.1	
2	25 TO 100	41.6	
3	25 TO 100	42.6	
4	25 TO 100	40.9	

HEATER / SENSOR

	LIMITS OHMS	READING	COMMENTS
T1	.25K TO 2.0K	1.9K	
T2	.25K TO 2.0K	1.9K	
(HTR) CFP	3.5K ± 500	3.5K	
TSB	10 TO 200	51.2	

DESIGN ENGINEERING [illegible]

METERS USED	MODEL	SERNO	CAL DUE DATE
1)	HP 3435A METER	503228	29 JAN 81
2)	TP 325	SSCC# 502772	NCR
3)			

ACCEPT 12/13/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16192

SCALE	REV D	SHEET 29

ORIGINAL PAGE IS
OF POOR QUALITY

FLIGHT CFPA
TEST SHEET 9

FREQUENCY RESPONSE CFPA / BAND 6 DATE FEB 7 1982

CFPA SERNO 201 BAND 6 PREAMP SERNO 101

T1 READING .973 VOLTS = 92.x °K TEST ENGINEER

T2 READING .973 VOLTS = 92.3 °K N.C. DAVISON, III

CURRENT ~~+15~~ +19 VDC = .0749 AMPS* (80mA MAX); ~~−15~~ −19 VDC = .0750 AMPS* (80mA MAX)

CHANNEL	R14 VOLTS	3db POINT	R17 VOLTS	R20 VOLTS	R17 OHMS	R20 OHMS	R17 mA	R20 mA	COMMENTS
1	0.76✓	13KHZ	10.36	10.36	2050	2050	5.05	5.05	See below
2	2.49✓	13KHZ	7.92	7.92	1400	1400	5.66	5.66	" "
3	0.69✓	13KHZ	7.12	7.13	1400	1400	5.09	5.09	" "
4	2.18✓	13KHZ	7.98	7.98	1400	1400	5.70	5.70	" "

DESIGN ENGINEER Darrell C. Davison III

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1)	H-P 3438A	GM-26	6 AUG 1982
2)	H-P 6255A	GV-14	NCR 2-10-82
3)	FLUKE 8020A	M-69	23 AUG. 1982
4)			
5)			
6)			
7)			
8)			
9)			

*AFTER 3 MINUTES

ACCEPT 118 2/13/82

CH	100	1K	2KHZ	5KHZ	10KHZ	20	52
1	0.0	.03	−.09	−.77	−2.50	−6.17	−13.3
2	0.0	0.0	−.13	−.81	−2.56	−6.19	−13.4
3	0.0	.02	−.08	−.78	−2.52	−6.17	−13.31
4	0.0	−.01	−.14	−.80	−2.54	−6.21	−13.4

FREQUENCY RESPONSE TABULATIONS IN dB

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
	SCALE	REV C	SHEET 38

BAND 6 TEST AHR #50973 OPERATION #2300.
GAIN LEVELING PER 16192 PARAGRAPH 4.13

TEST SHEET 11

Sheet 2 of 2

NCJ

FREQUENCY RESPONSE BAND 6 (Continued)

ORIGINAL PAGE IS OF POOR QUALITY

CHANNEL	3db POINT 13KHz±2KHz	RISE TIME 80µS MAX	SETTLING TIMES @120µS 1.5% MAX	SETTLING TIMES @240µS 1% MAX	OVERSHOOT 10% MAX	TIME DELAY (NS) Leading	TIME DELAY (NS) Trailing	DROOP 0.4%MAX	R41 VALUE 908 No.	R44 VALUE 908 No.
1										
2										
3										
4										

TIME DELAY - ALL READINGS IN THESE COLUMNS HAVE TO BE WITHIN ± 0.5 µs OF EACH OTHER.

		VALUE	PART NO. 908
	R1	4.99K	-193
	R2	4.99K	-193
	R3	4.99K	-193
	R4	4.99K	-193
	R5	5.62K	-198
	R6	5.62K	-198
	R7	5.62K	-198
	R8	5.62K	-198
CH 1	R21	26.7K	-263
CH 2	R22	7.50K	-210
CH 3	R23	26.7K	-263
CH 4	R24	7.50K	-210

Test Engineer C. R. Lane

Date 02-17-82

Design Engineer [signature]

Date FEB. 17, 1982

Q. A. VERIFY R21-24 ON SELECTS AS SHOWN AND THEY COME FROM THE ORDER SELECT LIST

Date VERIFY ALL CHANNELS. 2/17/82

REF. #50912 AHR SN 231
OPERATION #600

SIZE	CODE IDENT NO	NUMBER
A	11323	16192
SCALE	REV D	SHEET 44

NO 0122 DIETZGEN POST CLEARPRINT 1000H

ORIGINAL PAGE IS
OF POOR QUALITY

TM CFPA

FLIGHT BAND #7

S/N 201

ORIGINAL PAGE IS OF POOR QUALITY

BAND 7 RADIOMATRIC

TEST SHEET 12
SHEET 3 OF 3

SIGNAL/NOISE

CFPA SERNO 201 BAND 7 PREAMP SERNO 201 DATE: FEB. 19, 1982

BAND 7 POST AMP SERNO 201

T1 READING .976 VOLTS= 91.0 °K

T2 READING .976 VOLTS= 91.0 °K

TEST ENGINEER N.C. DAVISON, III

SCOPE GAIN =	10 mV	1 mV	500 μV	200 mV	50 mV	20 mV
	x 48.8	x 495	x 980	x 2.46	x 9.67	x 24.5

CHANNEL	PREAMP OUTPUT @ ≈ 1KHZ SIGNAL	PREAMP OUTPUT @ ≈ 1KHZ NOISE	PREAMP BROAD BAND NOISE	POST AMP OUTPUT @ ≈ 1KHz SIGNAL	POST AMP OUTPUT @ ≈ 1KHz NOISE	POST AMP BROAD BAND NOISE	CALCULATIONS MAX $\leq 4.8\times10^{-12}$ W NEP λ	CALCULATIONS MIN ≥ 1.0 A/W Rλ	POST AMP. GAIN
1	476 mV	859 mV/√Hz	.44 V	617 mV	410 μV/√Hz	.61 V	2.2×10^{-12}	1.9	25.7
2	470	840	.47 V	~~619~~ 613	397	.66 V	2.4	1.9	25.9
3	481	811	.41 V	~~620~~ 604	376	.59 V	2.2	1.9	24.9
4	435	791	.40 V	~~619~~ 610	415	.67 V	2.4	1.8	27.8
5	435	762	.38 V	~~619~~ 600	405	.61 V	2.3	1.7	27.4
6	426	733	.37 V	~~619~~ 610	415	.76 V	2.8	1.7	28.4
7	444	798	.40 V	605	410	.72 V	2.6	1.8	27.0
8	480	830	.38 V	603	376	.69 V	2.5	1.9	24.9
9	414	782	.39	623	434	.69 V	2.5	1.7	29.9
10	432	811	.40	624	444	.89 V	3.2	1.7	28.6
11	429	782	.40	614	405	.67 V	2.4	1.7	28.4
12	478	782	.41	623	386	.69 V	2.5	1.9	25.8
13	473	791	.42	614	357	.56 V	2.0	1.9	25.8
14	485	753	.45	613	386	.69 V	2.5	2.0	25.1
15	464	724	.39	601	386	.58 V	2.1	1.9	26.0
16	445 mV	772 mV/√Hz	.41	614 mV	405	.65 V	2.4	1.8	27.4

POST AMP GAIN SEE ABOVE
APERTURE TO FILTER = 18.1 cm.
DETECTOR AREA = 2.845×10^{-5} cm^2
$H_0^{\infty} = 3.4\times10^{-5}$ W/cm^2
BLACKBODY TO λ = 43.7
BLACKBODY TEMPERATURE = 800 K
DESIGN ENGINEER Willie C. Davison III

FEEDBACK RESISTOR = $2.3\times10^{8}\,\Omega$
NOISE CORRECTION FACTOR 1.0
BANDWIDTH = 52 KHz
APERTURE DIAMETER = .257 cm
SCOPE GAIN SEE ABOVE
QA ENGINEER ACCEPT 118 2/22/82

SIZE	CODE IDENT NO	NUMBER
A	11323	16192

SCALE | REV 5 | SHEET 44

ORIGINAL PAGE IS OF POOR QUALITY

PER TEST AHR 50973
OPERATION 2500

BAND 7
RADIOMATRIC

TEST SHEET 12
SHEET 3 OF 3

SIGNAL/NOISE

CFPA SERNO 201 BAND 7 PREAMP SERNO 201 DATE: FEB. 16, 1982

BAND 7 POST AMP SERNO 201

T1 READING .976 VOLTS= 91.0 °K

T2 READING .976 VOLTS= 91.0 °K

TEST ENGINEER
N. C. DAVISON, III

SCOPE GAIN =	10 mV x48.75	1 mV x495	500 µV x980	200 mV x2.46	50 mV x9.67	20 mV x24.5	# B.W. = 10 Hz		
CHANNEL	PREAMP OUTPUT @ ≈ 1KHZ SIGNAL	NOISE#	BROAD BAND NOISE	POST AMP OUTPUT @ ≈ 1KHz SIGNAL	NOISE#	BROAD BAND NOISE	CALCULATIONS MAX $\leq 4.8 \times 10^{-12}$ W NEP λ	MIN ≥ 1.0 A/W Rλ	POST AMP. GAIN
1	468 mV	888 µV/√Hz	.47 V	630 mV	405 µV/√Hz	.62 V	2.2×10^{-12}	1.9	26.7
2	468	763	.49	627	415	.67	2.4	1.9	26.5
3	495	791	.44	631	415	.59	2.1	2.0	25.3
4	441	791	.42	627	434	.68	2.4	1.8	28.2
5	449	811	.40	627	405	.61	2.2	1.8	27.7
6	438	724	.38	635	405	.76	2.7	1.8	28.7
7	445	791	.41	622	405	.69	2.5	1.8	27.7
8	495	762	.39	630	405	.70	2.5	2.0	25.2
9	411	811	.39	628	415	.69	2.4	1.7	30.3
10	430	753	.41	626	434	.74	2.6	1.7	28.8
11	426	753	.41	619	434	.67	2.4	1.7	28.8
12	472	762	.42	620	397	.70	2.5	1.9	26.0
13	480	695	.44	626	357	.57	2.0	1.9	25.8
14	491	761	.47	624	415	.70	2.5	2.0	25.2
15	472	675	.41	622	386	.59	2.1	1.9	26.1
16	449 mV	695 µV/√Hz	.42	630 mV	415 µV/√Hz	.66 V	2.3×10^{-12}	1.8	27.8

POST AMP GAIN SEE ABOVE
APERTURE TO FILTER = 18.1 cm.
DETECTOR AREA = 2.845×10^{-5} cm²
$H_0^{\infty} = 3.4 \times 10^{-5}$ W/cm²
BLACKBODY TO λ = 43.7
BLACKBODY TEMPERATURE = 800K
DESIGN ENGINEER William C. Davison III

FEEDBACK RESISTOR = 2.3×10^{8} Ω
NOISE CORRECTION FACTOR 1.0
BANDWIDTH = 52 KHz
APERTURE DIAMETER = .257 cm.
SCOPE GAIN SEE ABOVE
QA ENGINEER P.G. Ryan ACCEPT I 118 2/16/82

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
	SCALE	REV 5	SHEET 44

PER 16192 PARAGRAPH 4.11

TEST SHEET 8

FREQUENCY RESPONSE CFPA / PREAMP

DATE: FEB. 10, 1982

CFPA SERNO 201 BAND 5 SERNO 201 BAND 7 SERNO 201

T1 READING .976 VOLTS= 91.0 °K

TEST ENGINEER

T2 READING .976 VOLTS= 91.0 °K

N. C. DAVISON, III

+15VDC .075 Amps MILLIAMPS (80mA MAX), -15VDC .075 Amps MILLIAMPS (80mA MAX)

	BAND 5			BAND 7		
CHANNEL	500 Hz (mV)	3db POINT 5KHz ± 2KHz	SLOPE	500Hz (mV)	3db POINT 5KHz ± 2KHz	6 ± 2db SLOPE
1	0 dB	8.5 KHz	-6 dB/oct	0 dB	7.9 KHz	-6 dB/oct
2	0 dB	9.1	-6	0 dB	8.1 KHz	-5.25
3	0 dB	8.5	-6	0 dB	7.5 KHz	-6
4	0 dB	7.0 +	-6	0 dB	8.3 KHz	-6
5	0 dB	8.0	-6	0 dB	8.2 KHz	-6
6	0 dB	7.9	-6	0 dB	8.2 KHz	-6
7	0 dB	7.0+	-6	0 dB	8.1 KHz	-6
8	0 dB	8.2	-6	0 dB	6.4 KHz	-6
9	0 dB	10	-6	0 dB	8.4 KHz	-6
10	0 dB	8.6	-6	0 dB	7.2 KHz	-6
11	0 dB	7.7	-6	0 dB	7.4 KHz	-6
12	0 dB	8.4	-6	0 dB	7.0 KHz	-6
13	0 dB	9.0	-6	0 dB	8.4 KHz	~~-5.25~~ -6.
14	0 dB	8.7	-6	0 dB	6.9 KHz	-5.25
15	0 dB	8.0	-6	0 dB	7.6 KHz	-6
16	0 dB	8.5 KHz	-6	0 dB	8.4 KHz	-6

EQUIPMENT USED: MODEL SERNO CAL DUE DATE

1)
2)
3)
4)
5)
6)
7)
8)

SEE ORIGINAL WITH BAND 5 DATA. NCD III FEB. 22, 1982

ORIGINAL PAGE IS OF POOR QUALITY

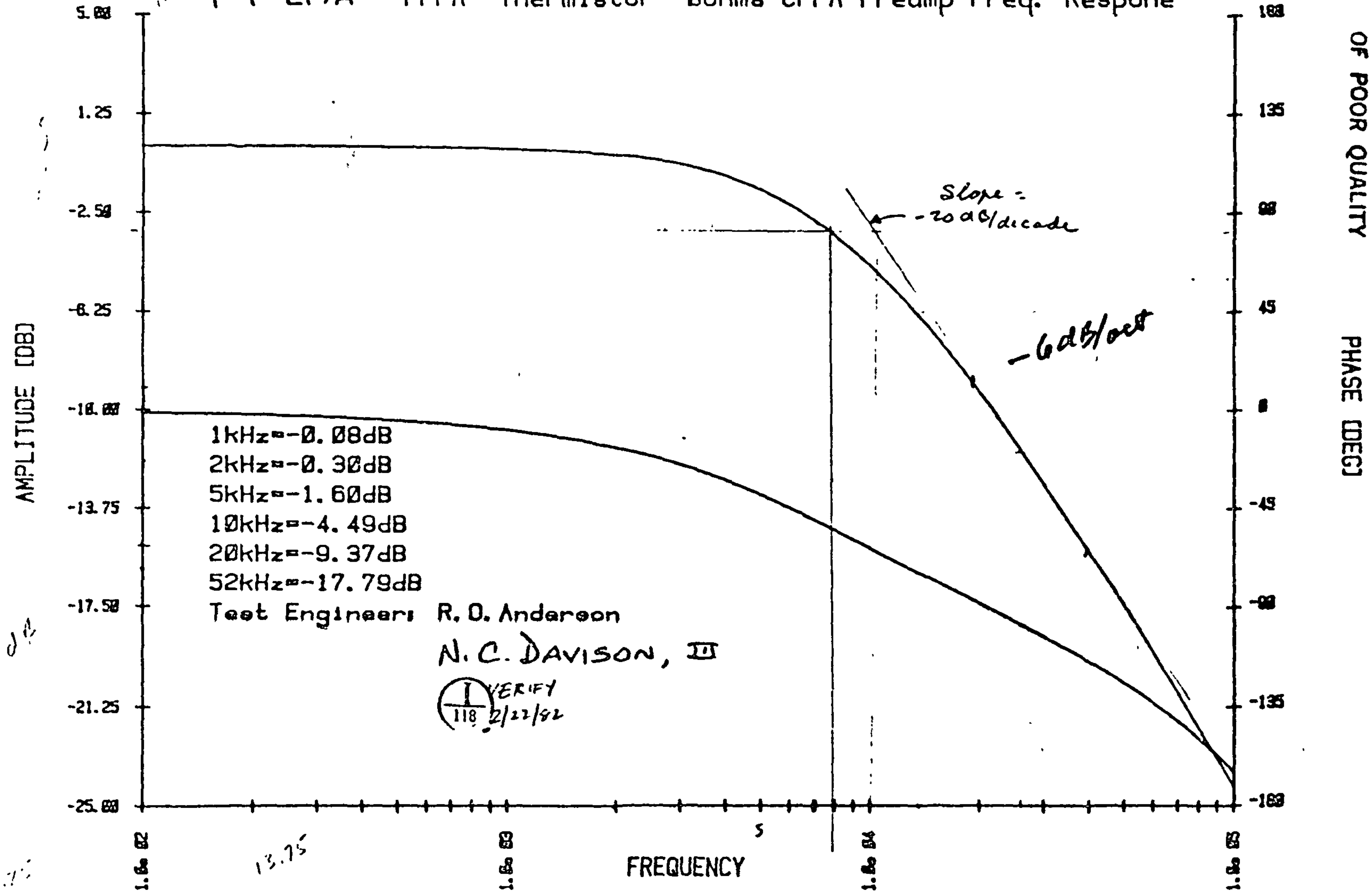
ALL CHANNELS EXCEPT BAND 7, CH 8 AND 14 OUT OF SPEC ON 3dB POINT 2/22/82 EO 4138A

DESIGN ENGINEER N. C. Davison III

SIZE	CODE IDENT NO	NUMBER
A	11323	16192
SCALE	REV	SHEET

BAND 7 CHANNEL 1 2/10/82

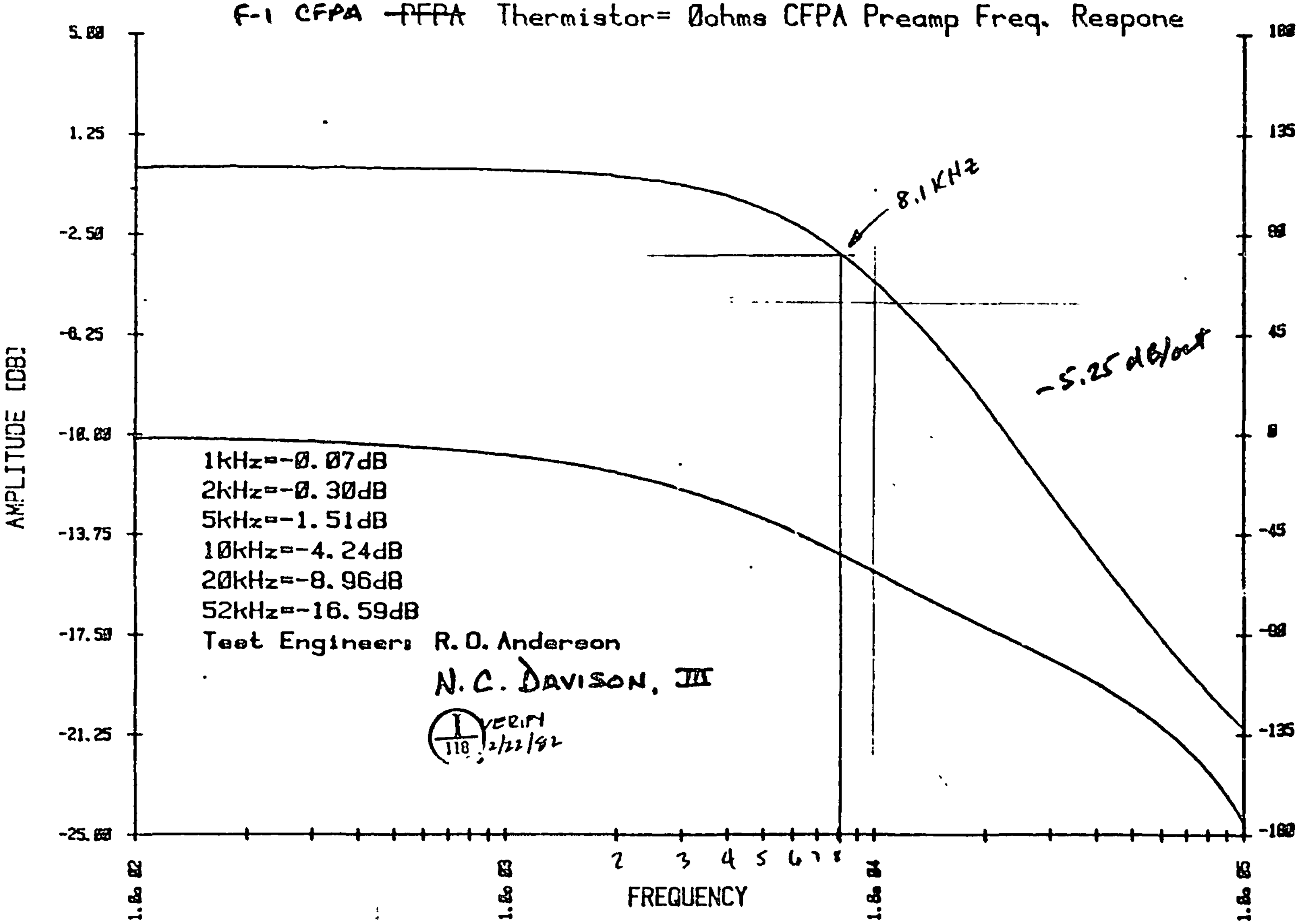
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Freq. Respone



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 7 CHANNEL 2 2/10/82

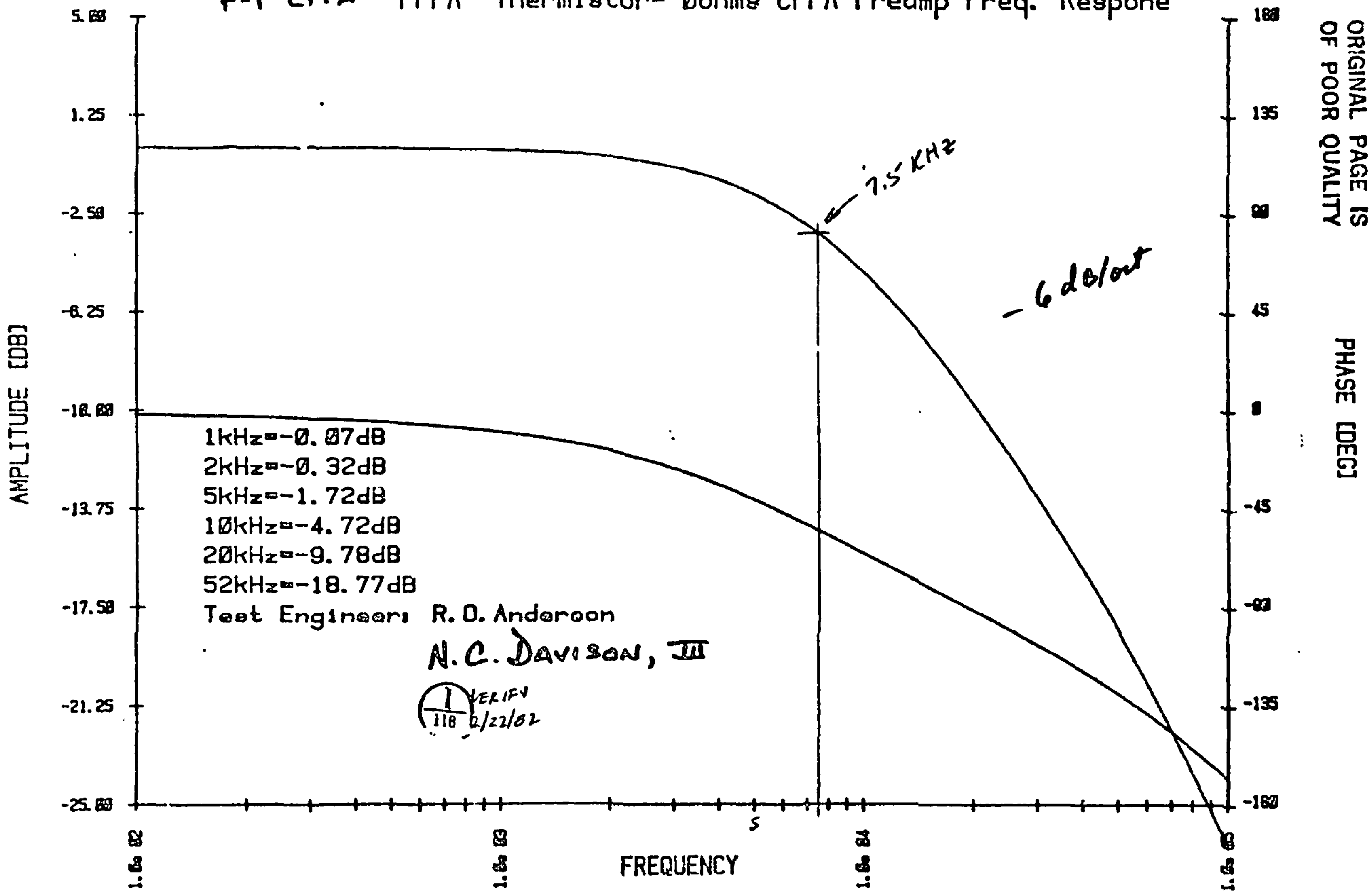
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq. Respone



ORIGINAL PAGE IS OF POOR QUALITY

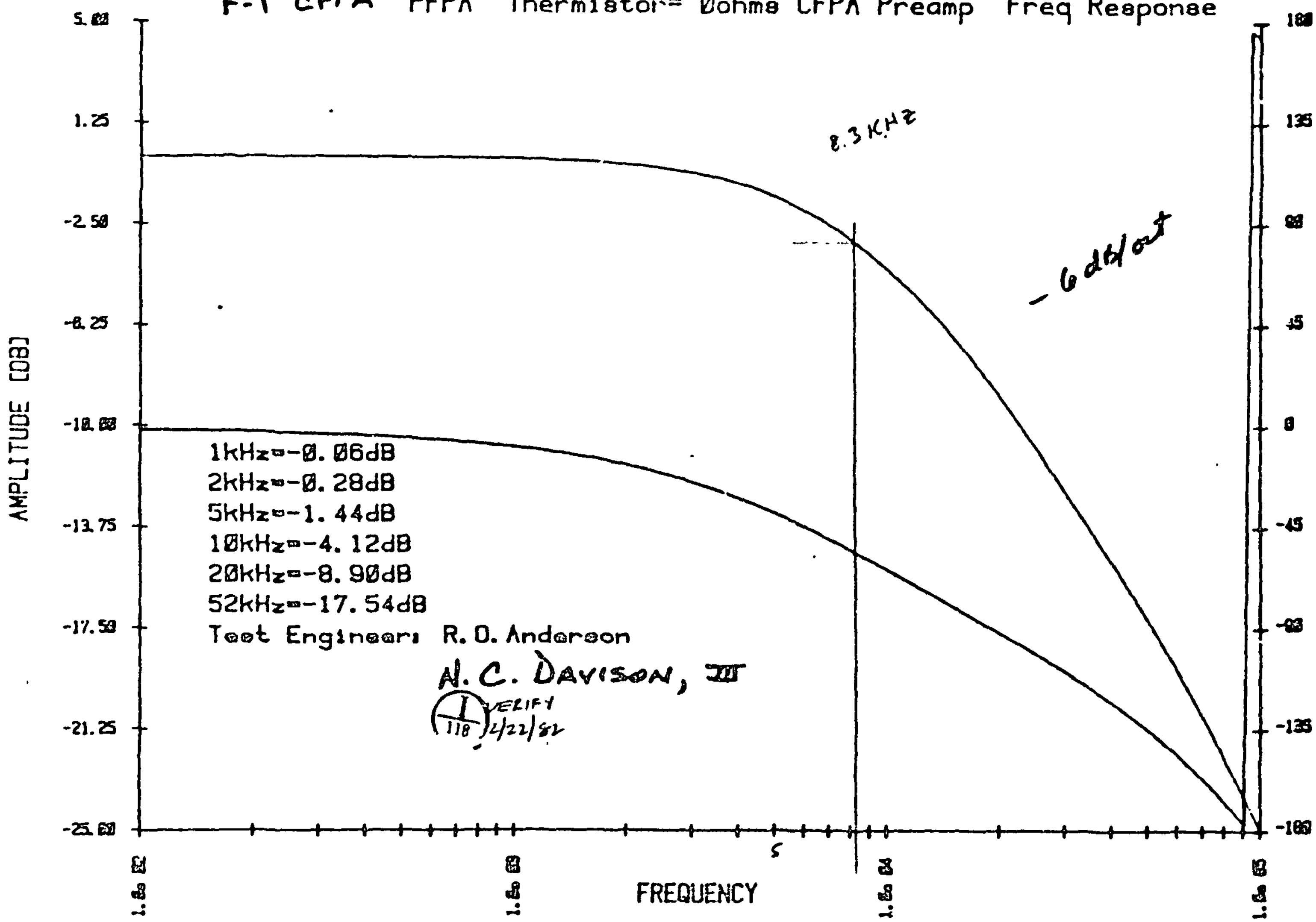
BAND 7 CHANNEL 3 2/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq. Respone



BAND 7 CHANNEL 4 2/10/82

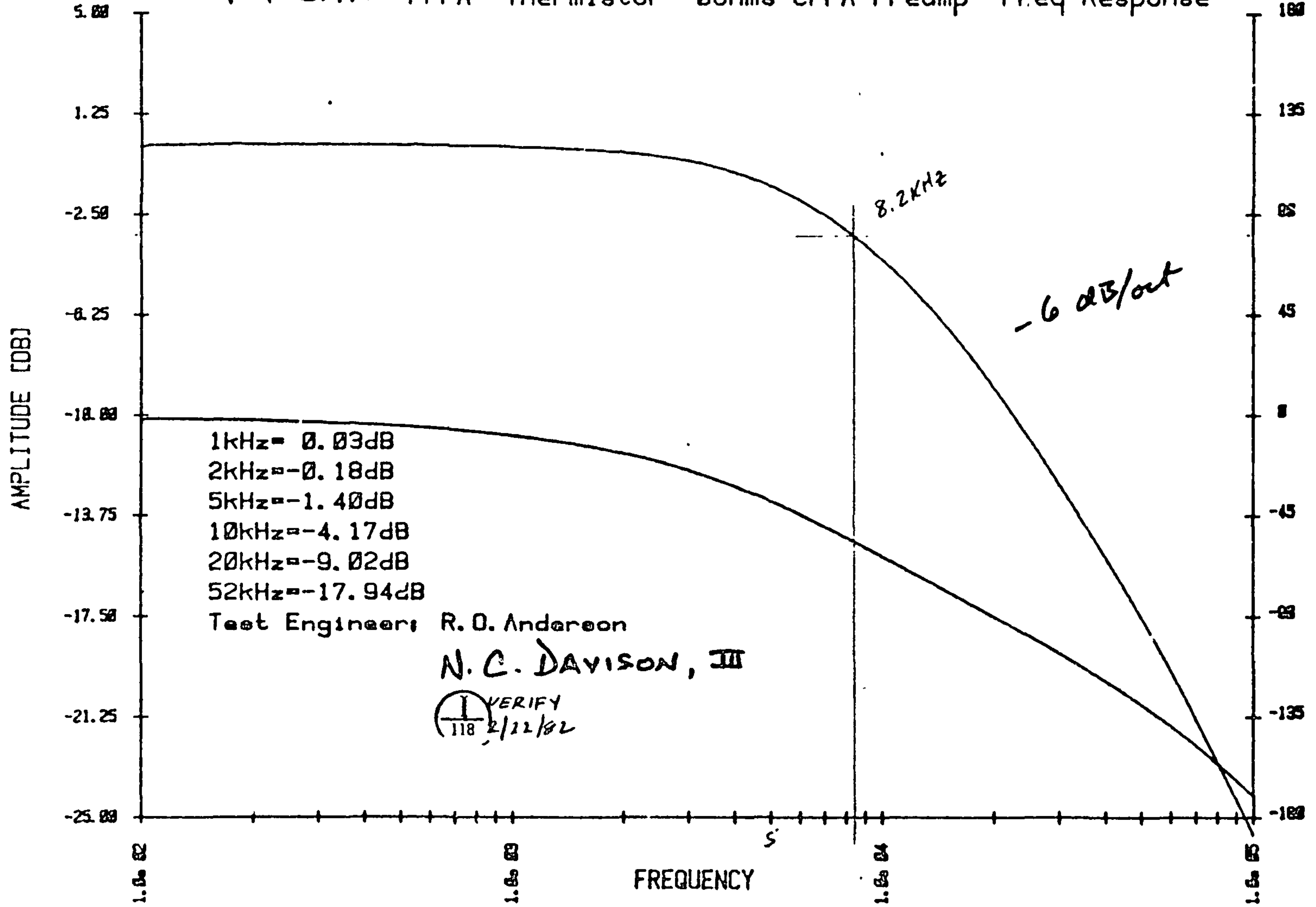
F-1 CFPA PFPA Thermistor= 0ohms CFPA Preamp Freq Response



ORIGINAL PAGE IS OF POOR QUALITY

BAND 7 CHANNEL 5 2/10/82

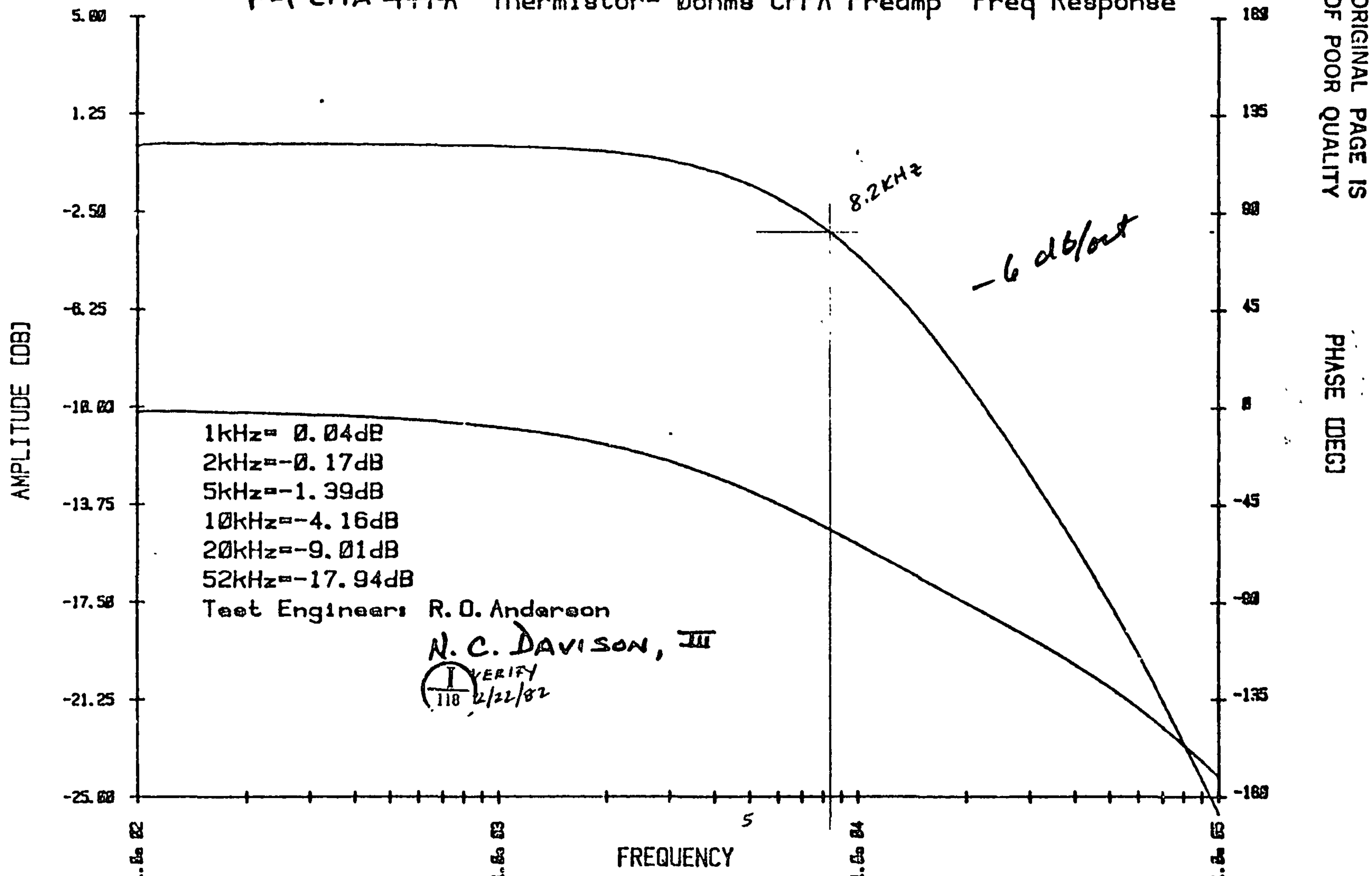
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq Response



HEWLETT PACKARD

BAND 7 CHANNEL 6 2/10/82

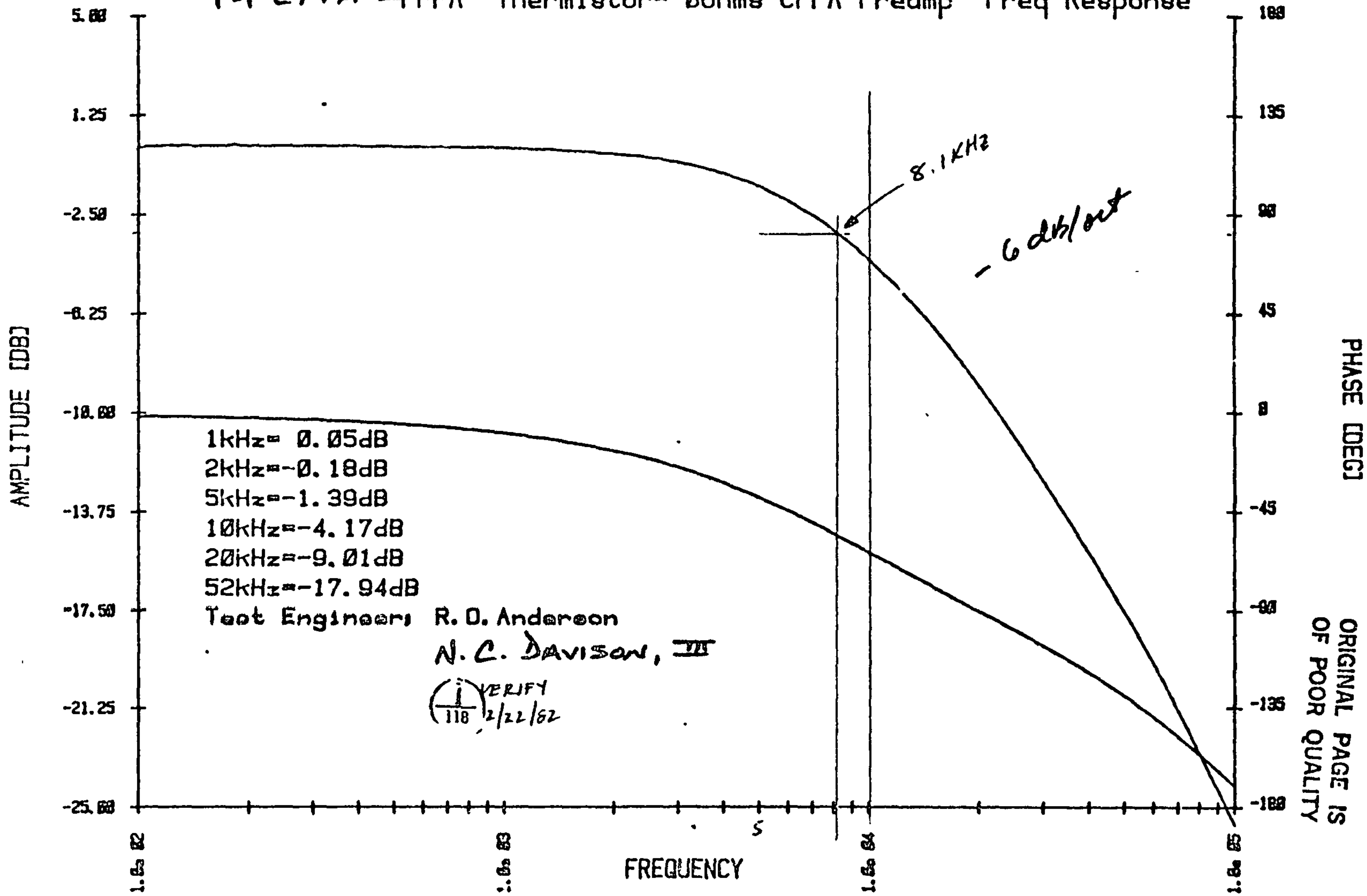
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Freq Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 7 CHANNEL 7 2/10/82

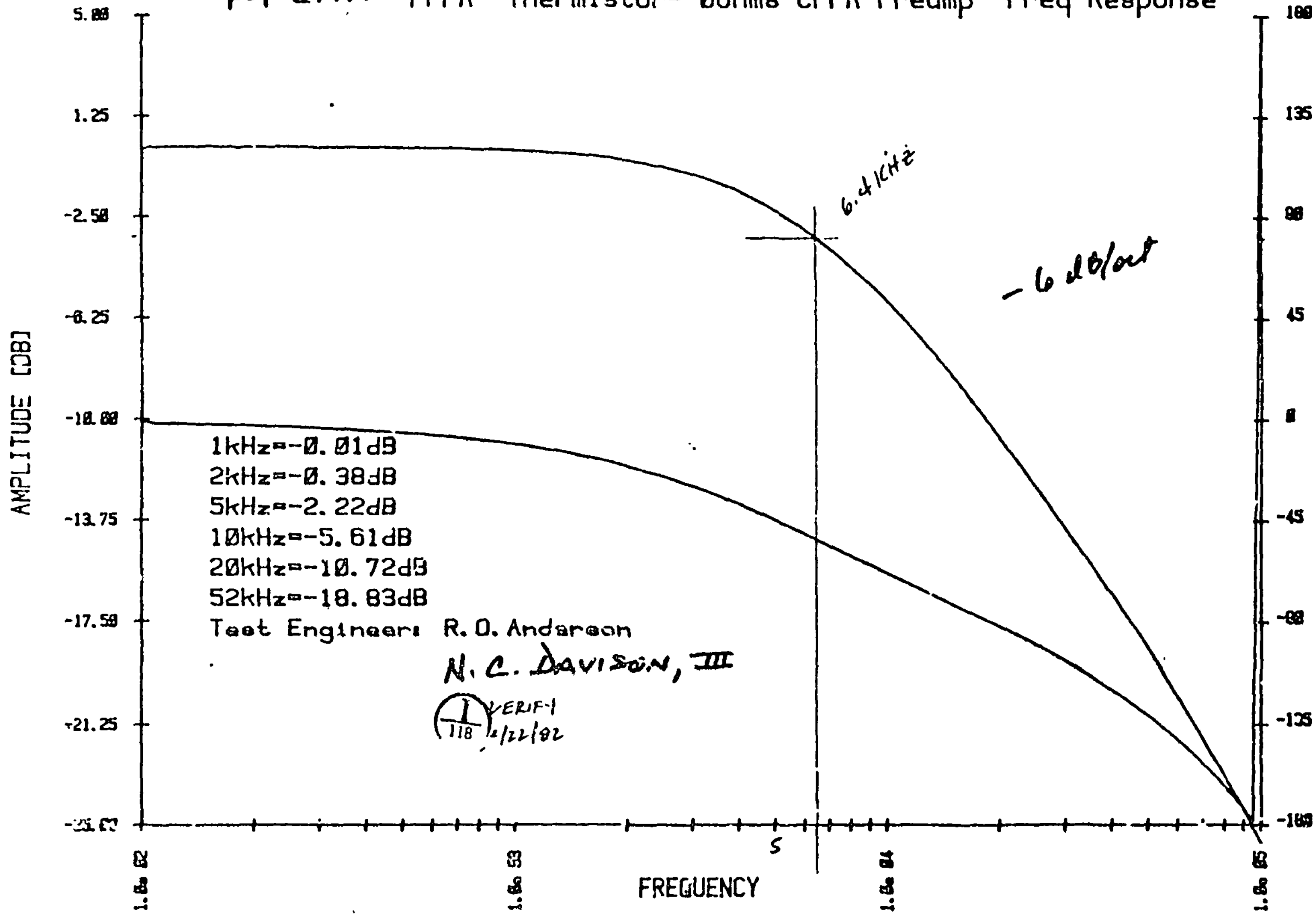
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq Response



HEWLETT PACKARD

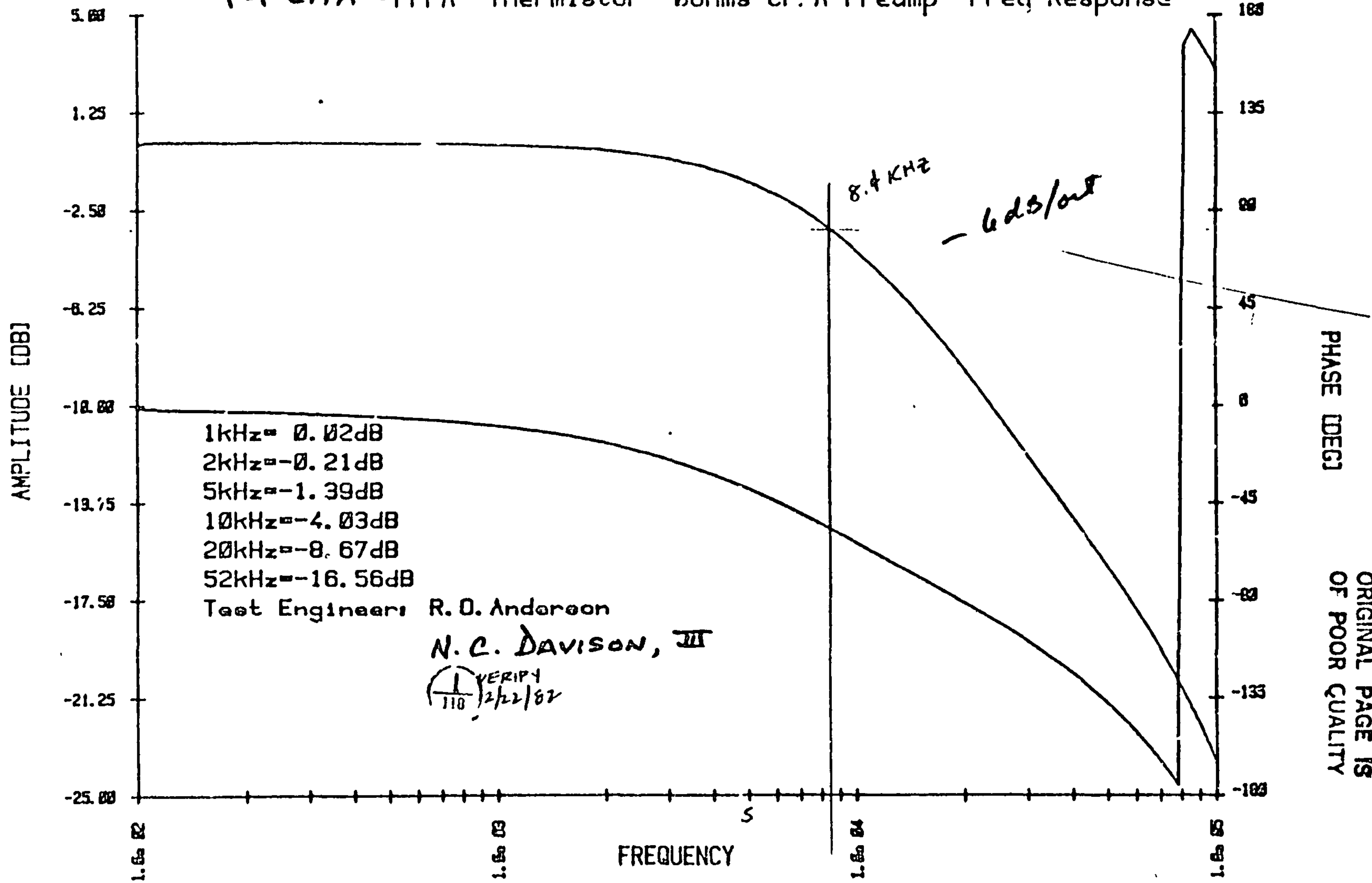
BAND 7 CHANNEL 8 2/10/82

F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq Response



BAND 7 CHANNEL 9 2/10/82

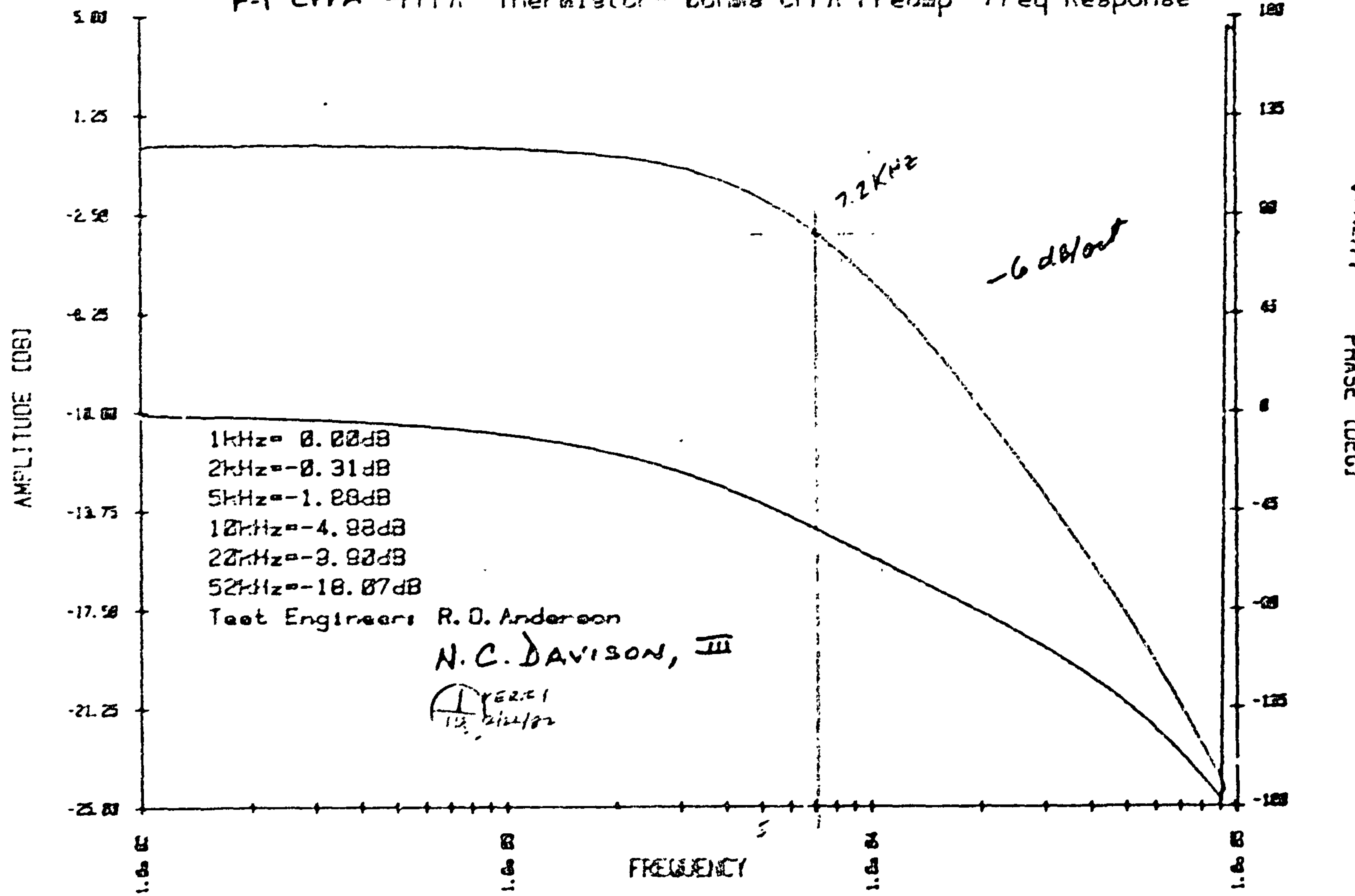
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CF?A Preamp Freq Response



ORIGINAL PAGE IS OF POOR QUALITY

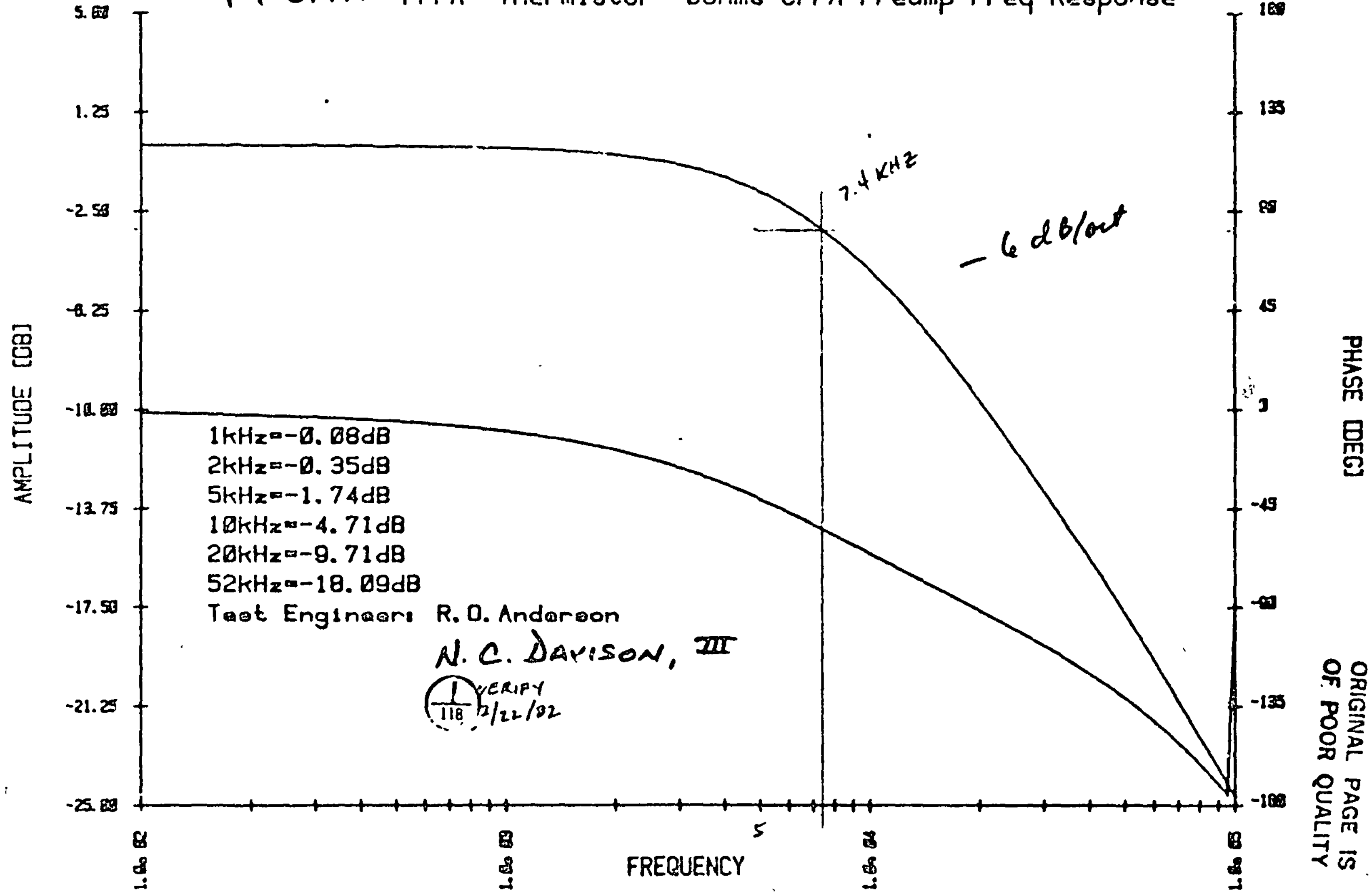
BAND 7 CHANNEL 10 2/10/82

F-1 CFPA ~~FFPA~~ Thermistor= 0ohms CFPA Preamp Freq Response



BAND 7 CHANNEL 11 2/10/82

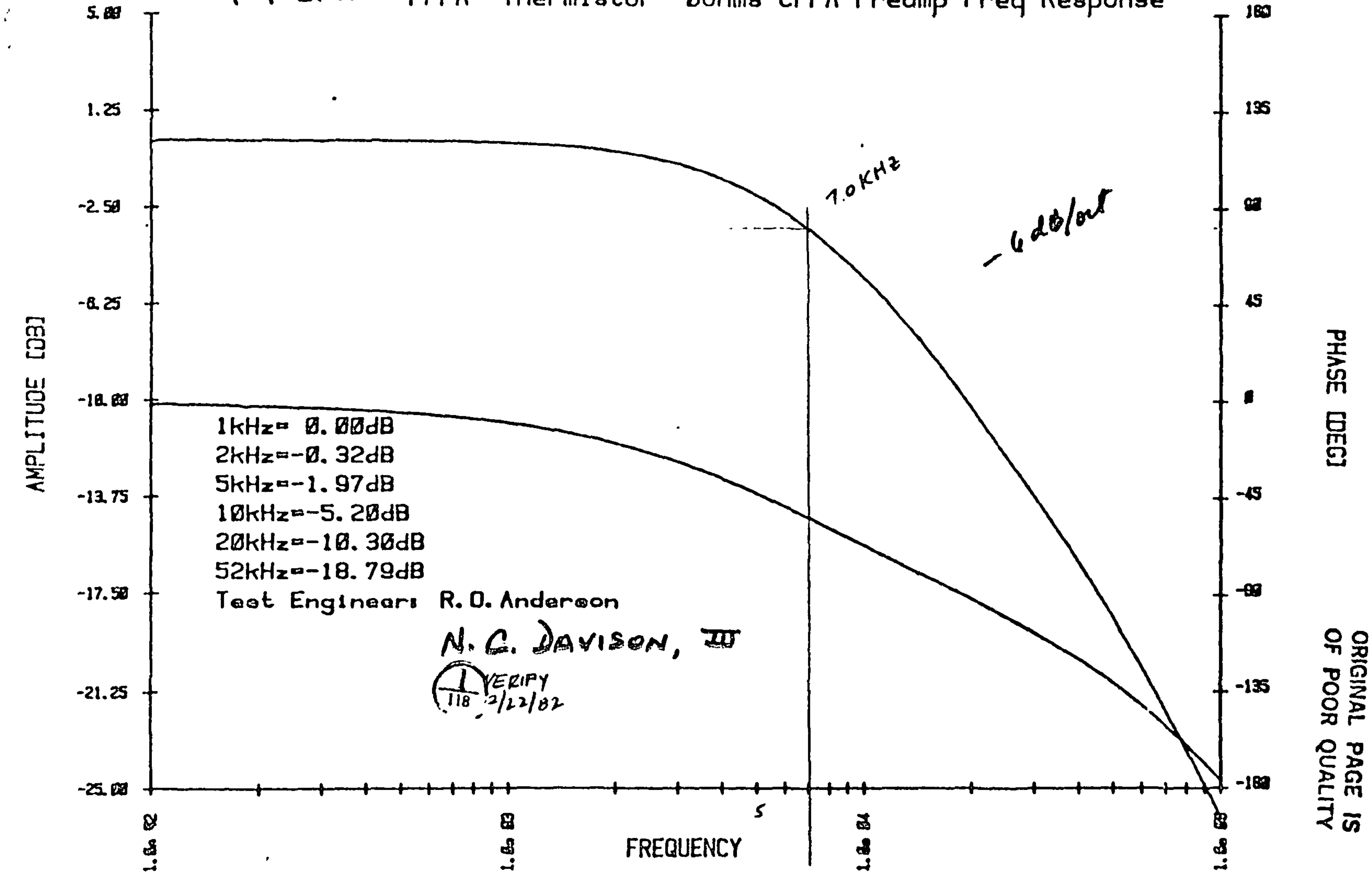
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Freq Response

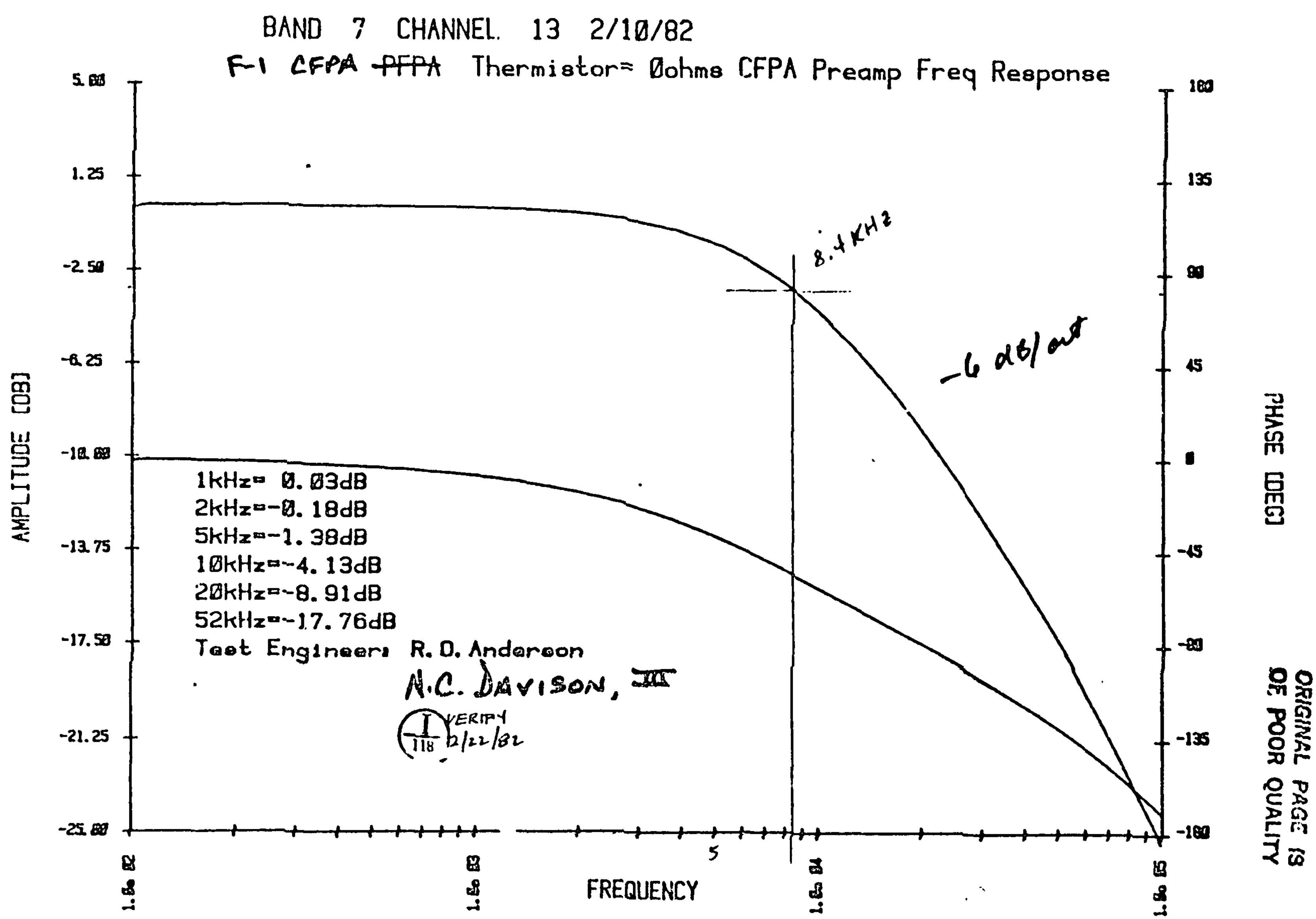


ORIGINAL PAGE IS OF POOR QUALITY

BAND 7 CHANNEL 12 2/10/82

F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Freq Response

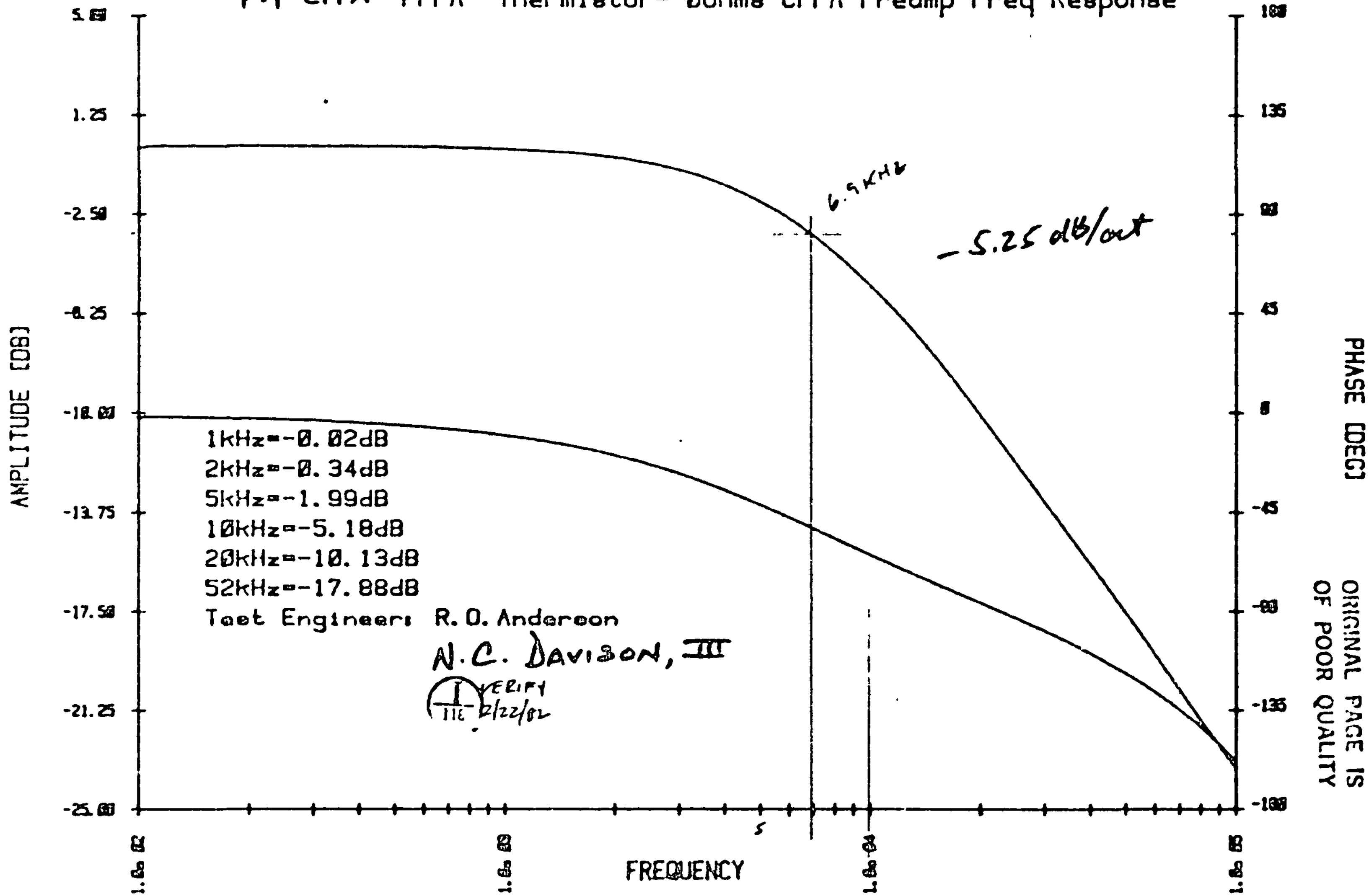




ORIGINAL PAGE IS
OF POOR QUALITY

BAND 7 CHANNEL 14 2/10/82

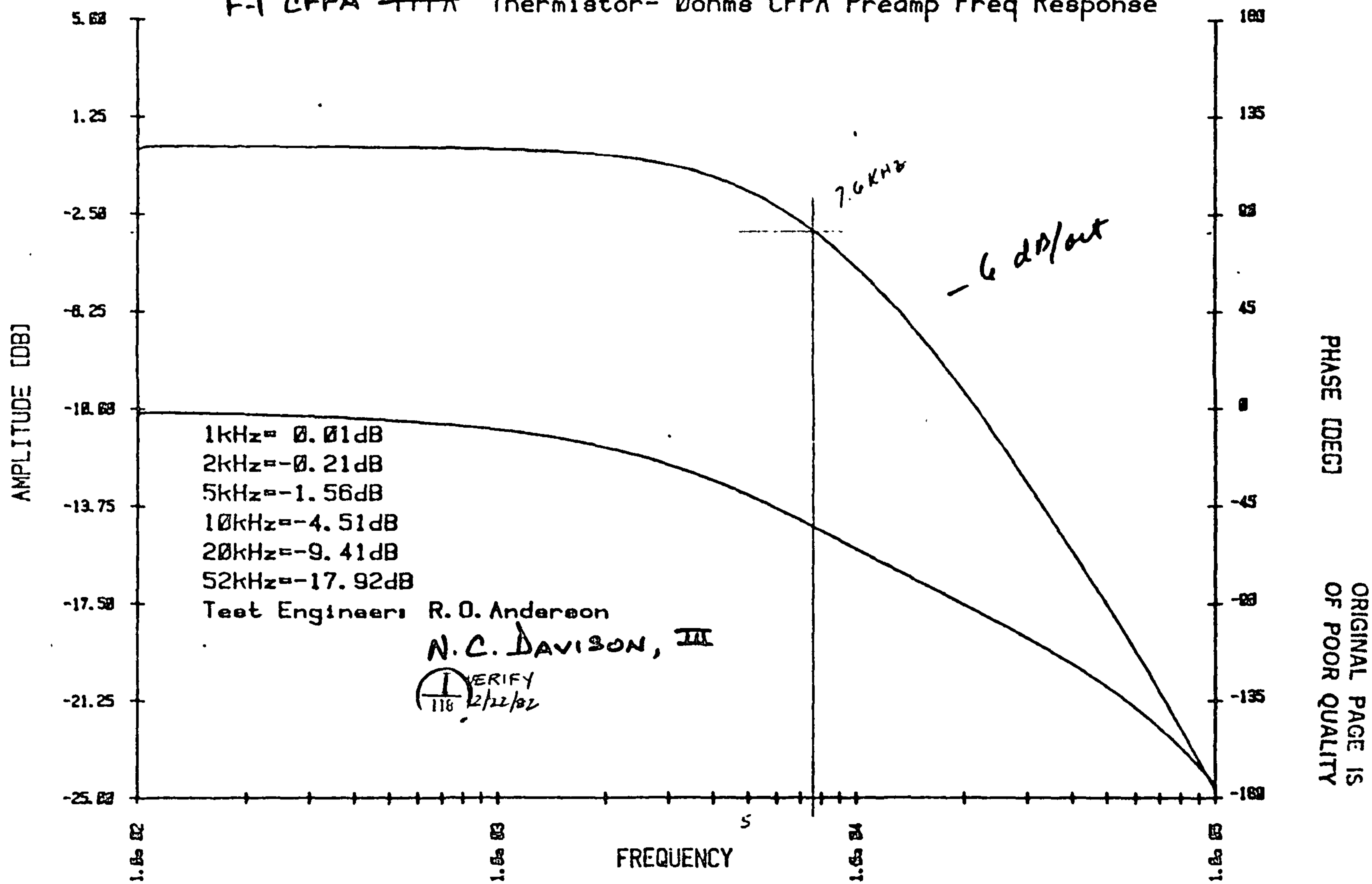
F-1 CFPA ~~PFPA~~ Thermistor= 0ohms CFPA Preamp Freq Response



ORIGINAL PAGE IS OF POOR QUALITY

BAND 7 CHANNEL 15 2/10/82

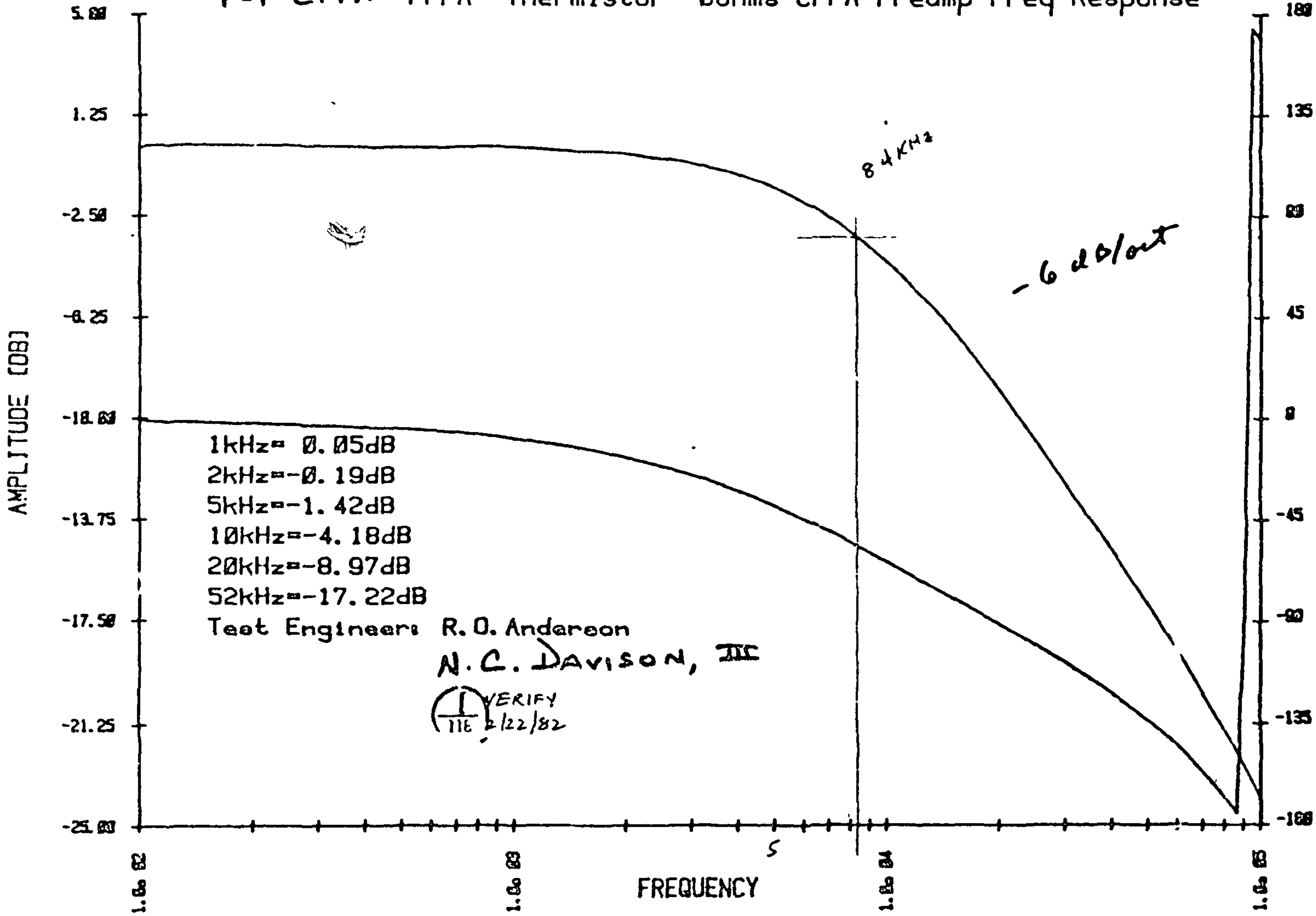
F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Freq Response



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 7 CHANNEL 16 2/10/82

F-1 CFPA ~~PFPA~~ Thermistor= Øohms CFPA Preamp Freq Response



ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

TEST SHEET 10
PAGE 3 of 4

BOOSTED FREQUENCY AND TRANSIENT RESPONSE BAND 7

DATE 10 Feb 82

CFPA SERNO 201

BAND 7 PREAMP NO. 201 BAND 7 POSTAMP NO. 201

T1 READING .975 VOLTS = 91.5 °K TEST ENGINEER

T2 READING .974 VOLTS = 91.9 °K R.O. Anderson NCJ III FEB. 11, 1982

CURRENTS: +19VDC = 99.0 AMPS −19VDC = 100.0 AMPS
150mA MAX 150mA MAX

CHL	BOOST RESISTOR NO	OHMS (KΩ)	PART 7926500-	ROLLOFF RESISTOR NO	OHMS (KΩ)	PART 1926500-	TRANSIENT RESPONSE RISE-TIME ≤20μS	SETTLING TIMES 5%	1%	OVERSHOOT 10% MAX	BOOSTED -52 KHz POINT	DELAY TIMES IN μSEC RISE	FALL
1	R1			R65			15μs	30	33	7.0	−2.89	12.0	12.3
2	R9			R73			12.0	30	33	6.0	−2.57	~~12.8~~	12.25
3	R2			R66			12.0	28	31	6.8	−2.98	11.8	12.2
4	R10			R74			12.0	30	32	9.0	−2.99	12.5	12.8
5	R3			R67			11.0	33	35	3.0	−3.25	12.0	12.6
6	R11			R75			12.0	29	40	11.0	−2.97	12.3	12.6
7	R4			R68			13.0	28	30	8.0	−2.95	12.2	12.5
8	R12			R76			11.0	28	38	10.0	−2.93	12.6	13.0
9	[illegible]			R69			12.0	28	34	9.0	−2.93	12.9	13.4
10	R13			R77			12.0	28	30	9.8	−2.92	12.5	13.2
11	R5			R70			11.0	22	38	8.0	−2.93	12.4	12.9
12	R14			R78			11.0	22	35	9.0	−2.95	12.3	12.7
13	R7			R71			11.0	28	29	8.0	−2.92	12.2	12.6
14	R15			R79			11.0	27	39	10.0	−2.86	12.4	12.8
15	R8			R72			11.0	28	40	8.0	−2.93	12.3	12.8
16	R16			R80			12.0	30	31	6.0	−3.32	13.0	13.4

DESIGN ENGINEER Arthur C. Lawson III

EQUIPMENT USED

	MODEL	SERNO	CAL DUE DATE
1)	3330 B SYN	G 457543	17 Feb 82
2)	3570A NET ANA.	G 457592	17 Feb 82
3)	7603 SCOPE	456991	~~27 ...~~ 18 APR 82
4)	9825 COMPUTER	457846	NCR
5)	7225 PLOTTER	457608	NCR
6)	6255 P.S.	457602	NCR
7)	162 BOX CAL AV.	456989	27 APR 82
8)	3400A RMS MET.	456999	18 JUN 82
9)	7044 X-Y PLOTTER	803975	29 JUN 82
10)	8012B GEN.	457604	21 APR 82

CH 5, 16 OUT OF SPEC AT 52KHz. CH 5 1.5% SETTLING TIME OUT OF SPEC. CH 6 OVERSHOOT OUT OF SPEC. DELAY TIME DIFFERENCES OUT OF SPEC ON BOTH RISE AND FALL.

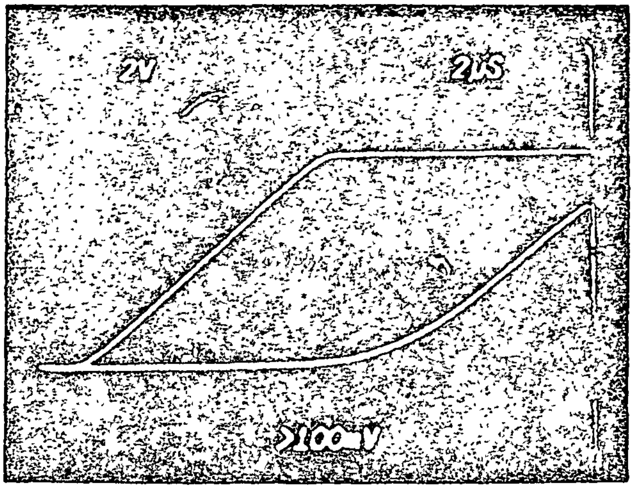
1212 2/11/82

F/R 8208 RH

SIZE	CODE IDENT NO	NUMBER
A	11323	

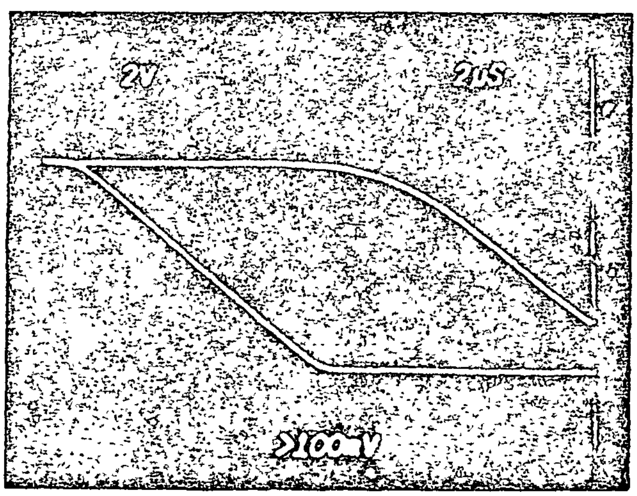
SCALE REV B SHEET 39

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 1

DELAY TIME
12.0 μSec



BAND 7
CHANNEL 1

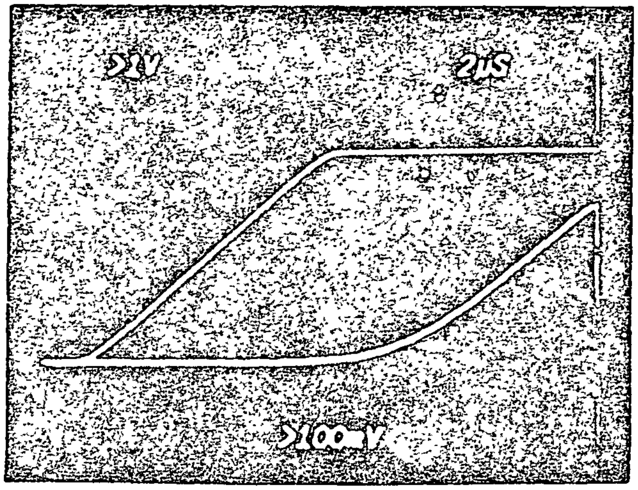
DELAY TIME
12.3 μSec

N. C. DAVISON

DATE: FEB. 11, 1982

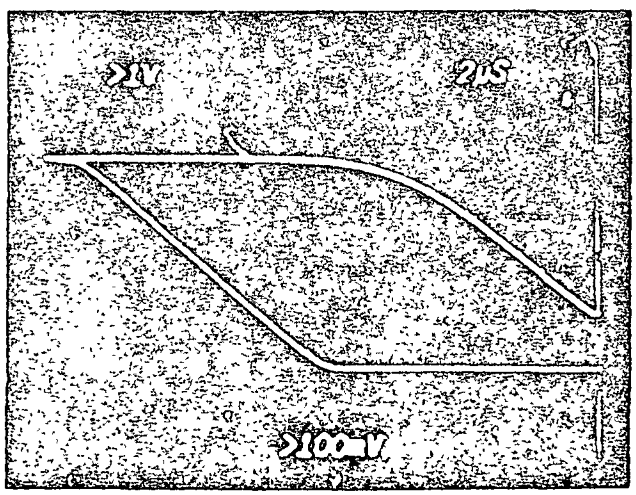
VERIFY
2/16/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 2

DELAY TIME
12.1 µSec



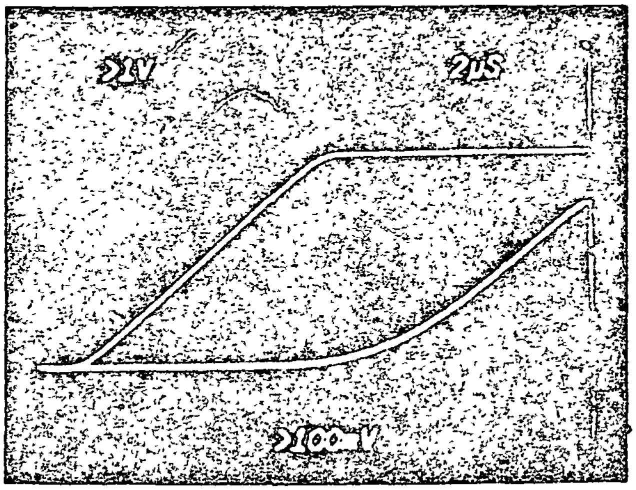
BAND 7
CHANNEL 2

DELAY TIME
12.5 µSec

N.C. DAVISON

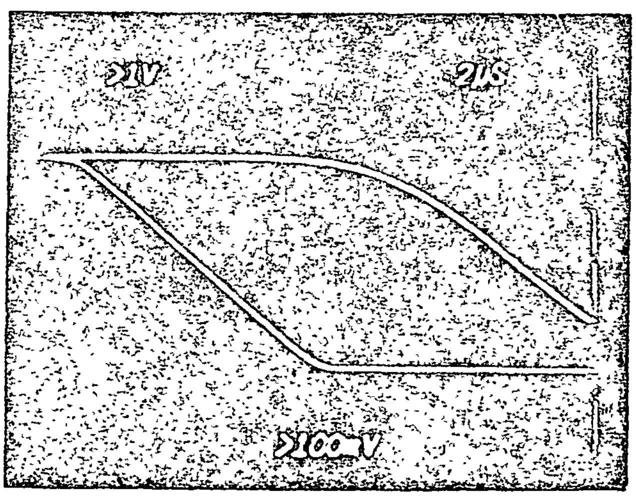
DATE: FEB 11, 1982
VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 3

DELAY TIME
11.8 µSec



BAND 7
CHANNEL 3

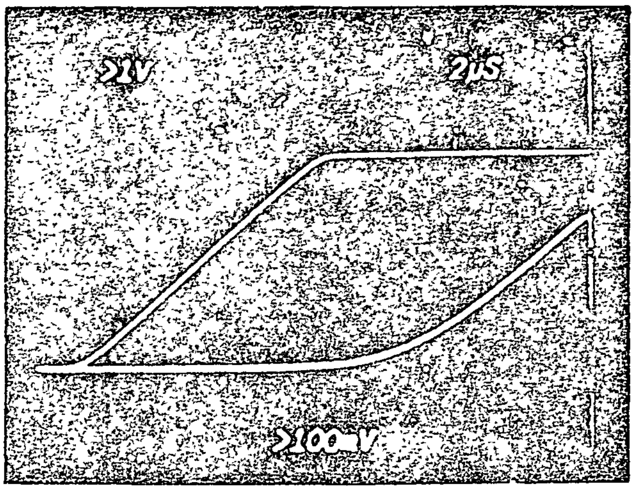
DELAY TIME
12.2 µSec

N.C. DAVISON

DATE: FEB. 11, 1982

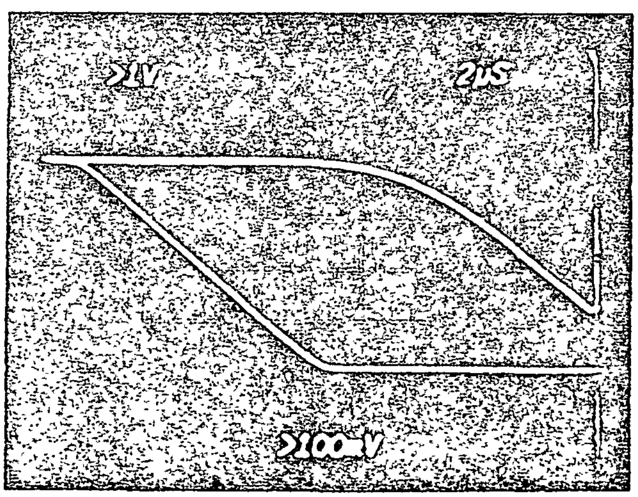
VERIFY 2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 4

DELAY TIME
12.5 μSec



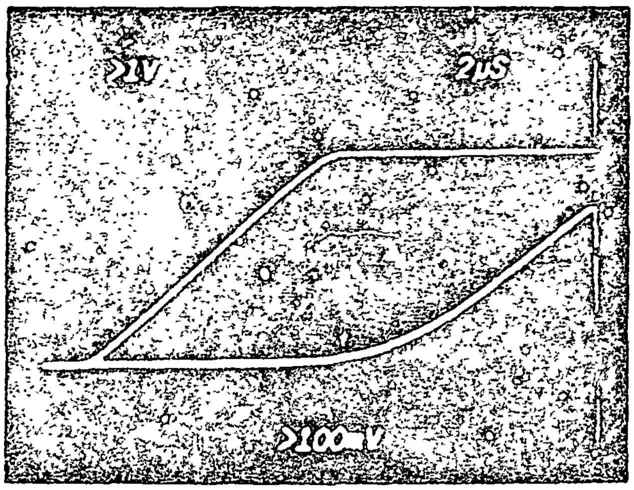
BAND 7
CHANNEL 4

DELAY TIME
12.8 μSec

N.C. DAVISON

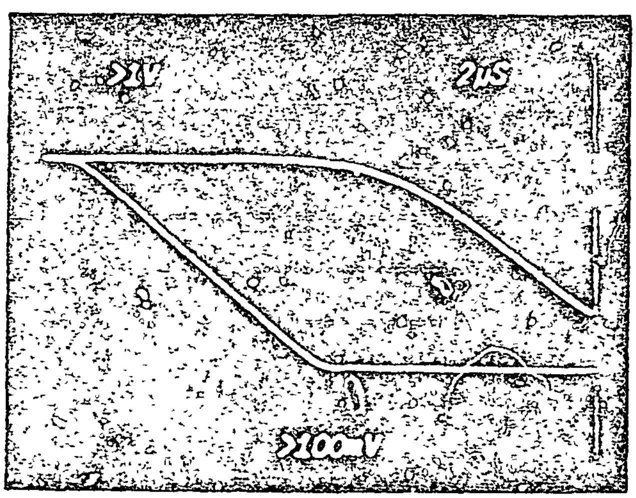
DATE: FEB. 11, 1982

VERIFY
2/18/82



BAND 7
CHANNEL 5

DELAY TIME
12.0 μSec



BAND 7
CHANNEL 5

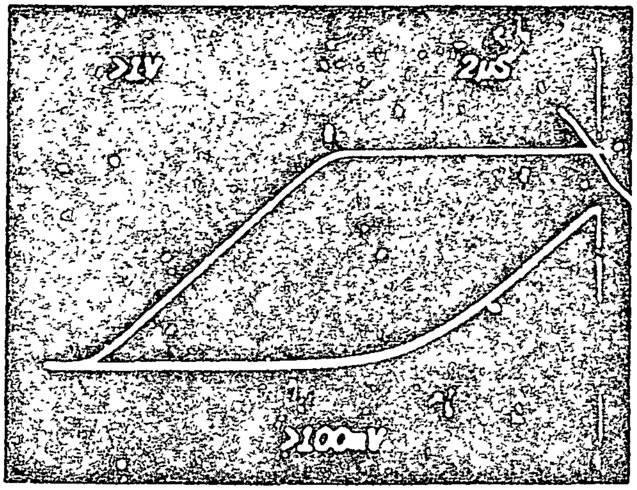
DELAY TIME
12.6 μSec

N.C. DAVISON

DATE: FEB 11, 1982

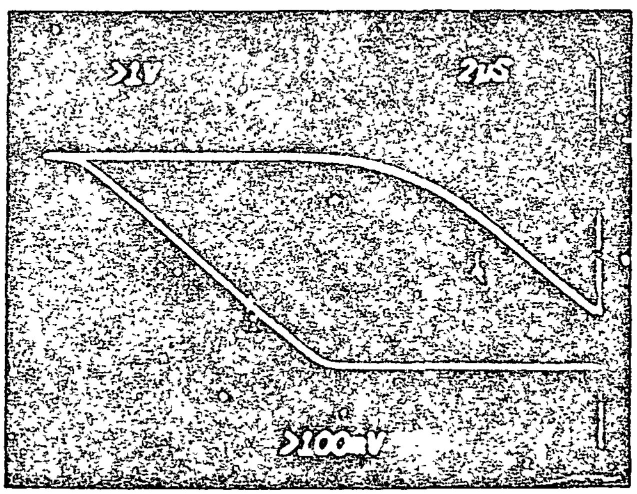
VERIFY
13 2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 6

DELAY TIME
12.3 µSec



BAND 7
CHANNEL 6

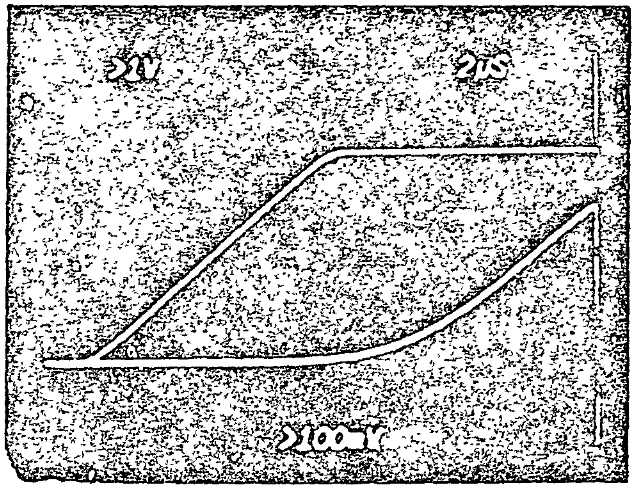
DELAY TIME
12.6 µSec

N.C. DAVISON

DATE: FEB. 11, 1982

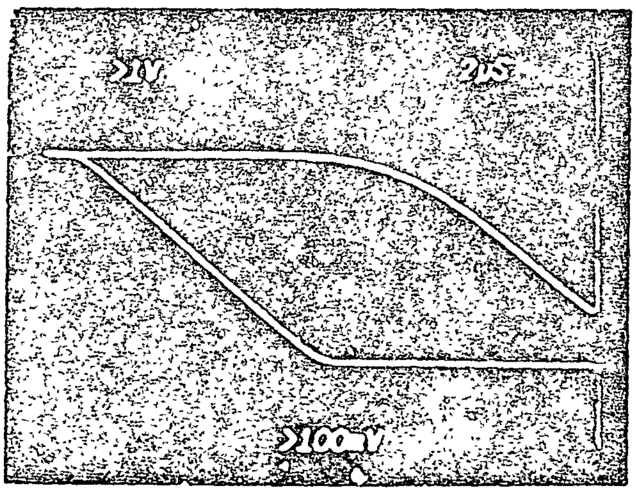
VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 7

DELAY TIME
12.2 μSec



BAND 7
CHANNEL 7

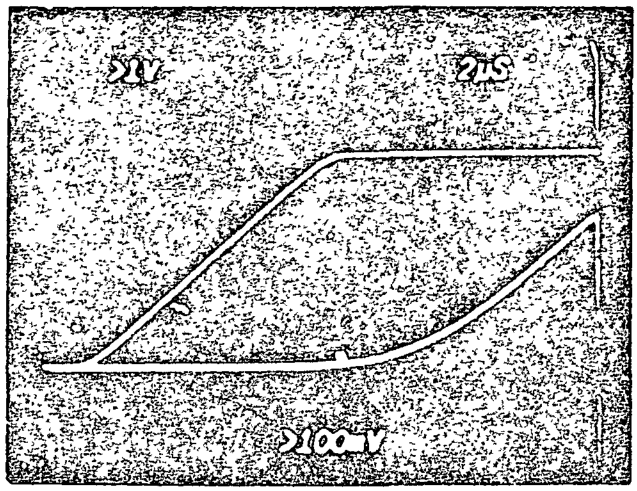
DELAY TIME
12.5 μSec

N.C. DAVISON

DATE: FEB. 11, 1982

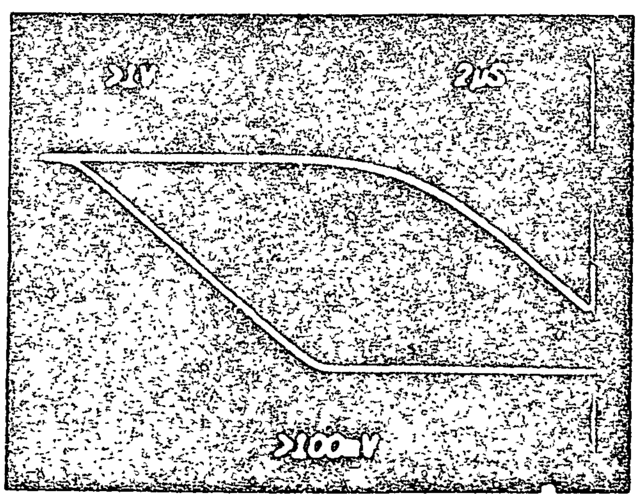
VERIFY
4/6/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 8

DELAY TIME
12.6 µSec

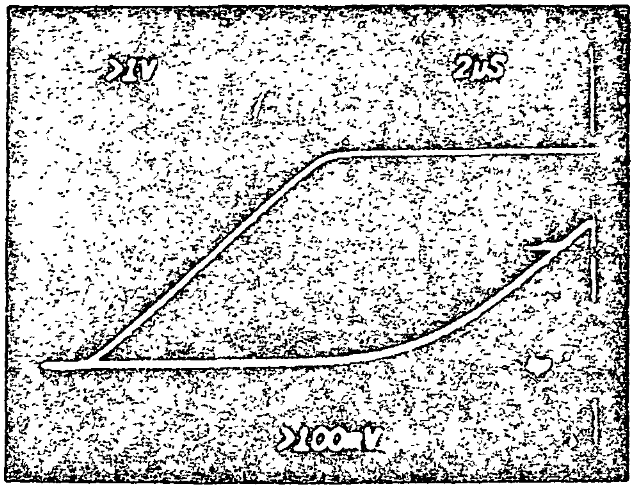


BAND 7
CHANNEL 8

DELAY TIME
13.0 µSec

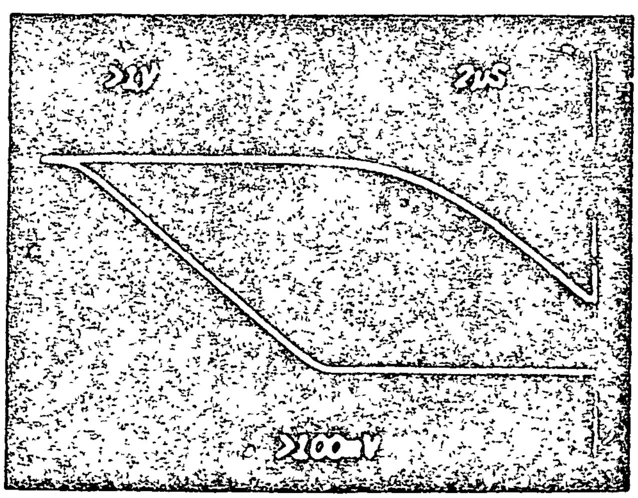
N.C. Davison

DATE: FEB. 11, 1982



BAND 7
CHANNEL 9

DELAY TIME
12.9 μSec



BAND 7
CHANNEL 9

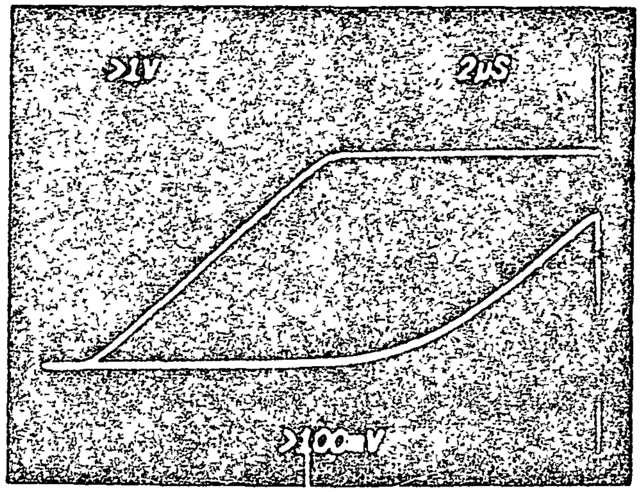
DELAY TIME
13.4 μSec

N.C. Davison

DATE: FEB. 11, 1982

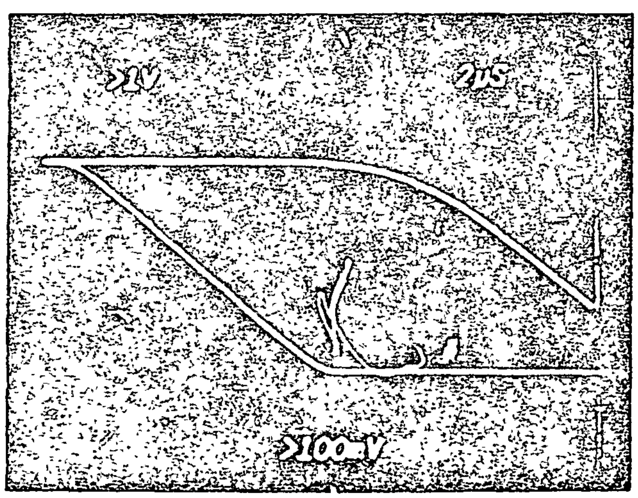
I verify
TJS 2/16/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 10

DELAY TIME
12.5 μSec



BAND 7
CHANNEL 10

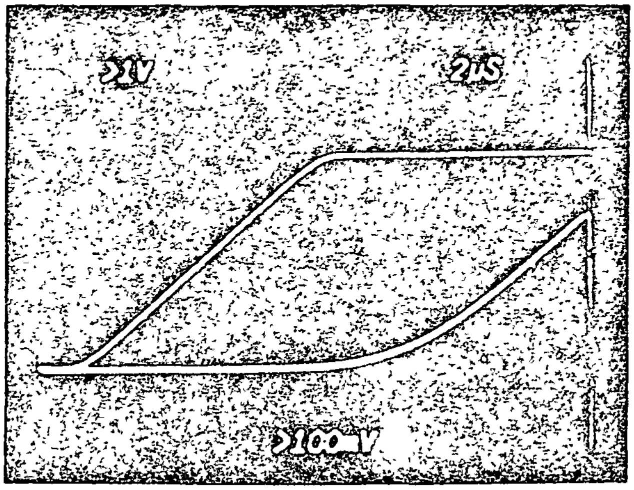
DELAY TIME
~~11.2~~
13.2 μSec

N.C. DAVISON

DATE: FEB. 11, 1982

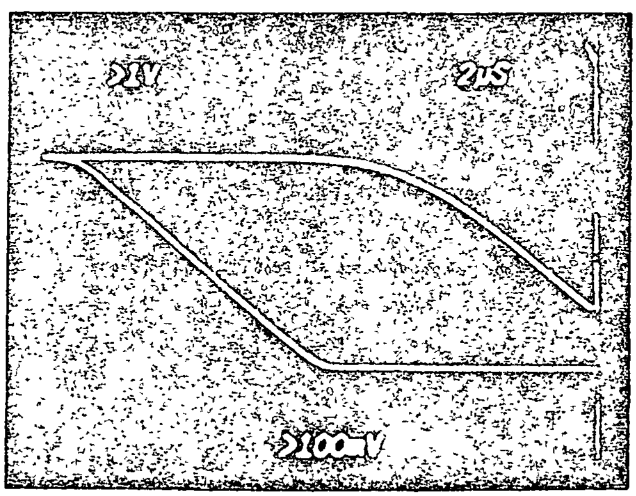
VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 11

DELAY TIME
12.4 µSec



BAND 7
CHANNEL 11

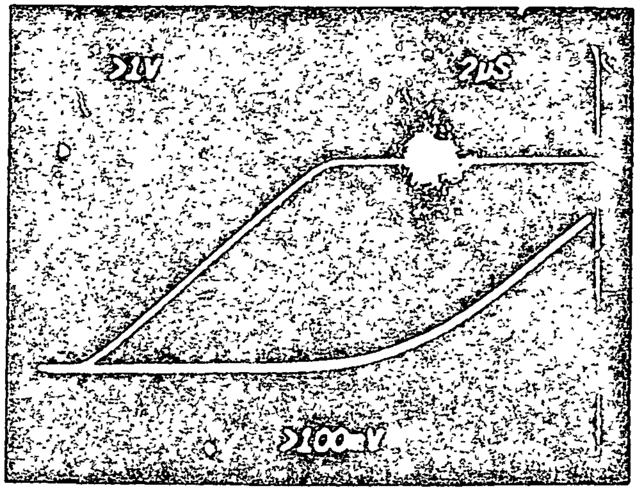
DELAY TIME
12.9 µSec

N.C. DAVISON

DATE: FEB. 11, 1982

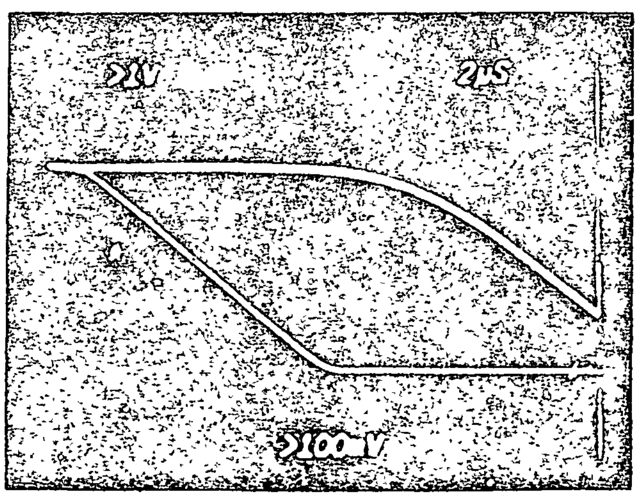
I VERIFY
2/16/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 12

DELAY TIME
12.3 μSec



BAND
CHANNEL

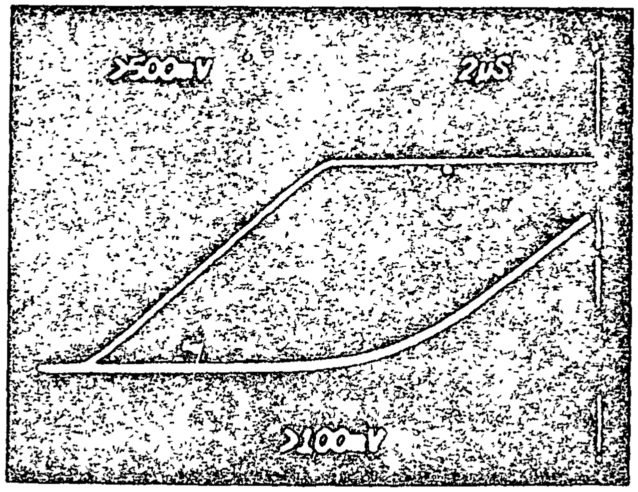
DELAY TIME
12.7 μSec

N. C. DAVISON

DATE: FEB. 11, 1982

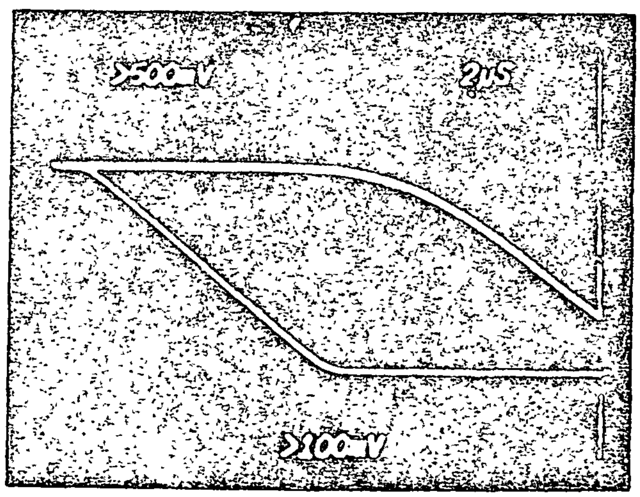
I VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 13

DELAY TIME
12.2 μSec



BAND 7
CHANNEL 13

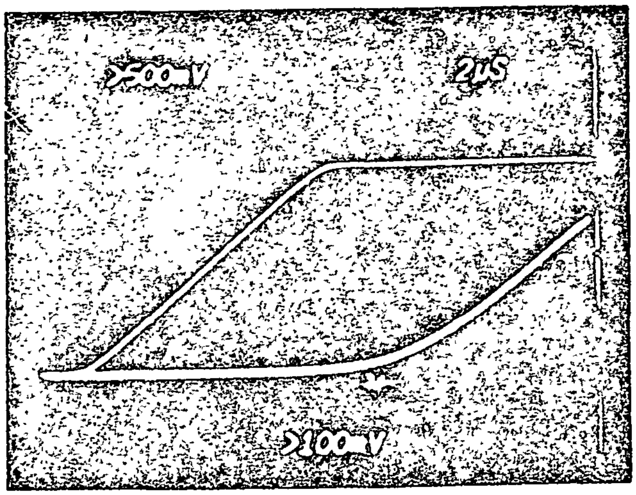
DELAY TIME
12.6 μSec

N.C. Davison

DATE: FEB. 11, 1982

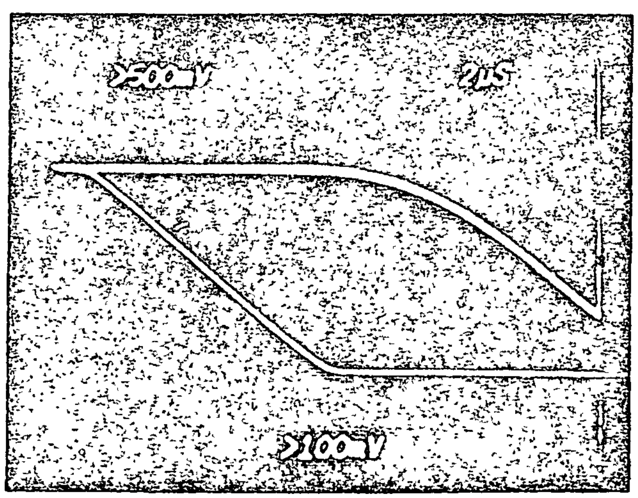
VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 14

DELAY TIME
12.4 µSec



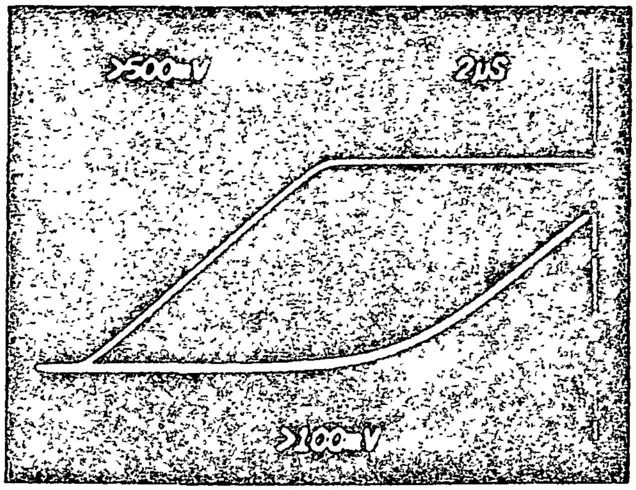
BAND 7
CHANNEL 14

DELAY TIME
12.8 µSec

N. C. Davison

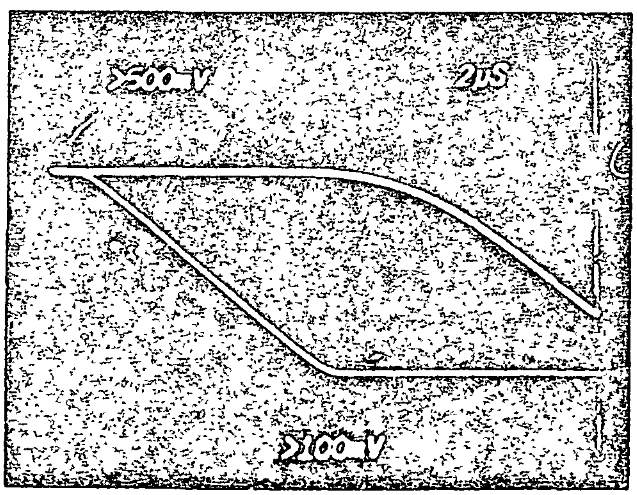
DATE: FEB 11, 1982
I VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 15

DELAY TIME
12.3 μSec



BAND 7
CHANNEL 15

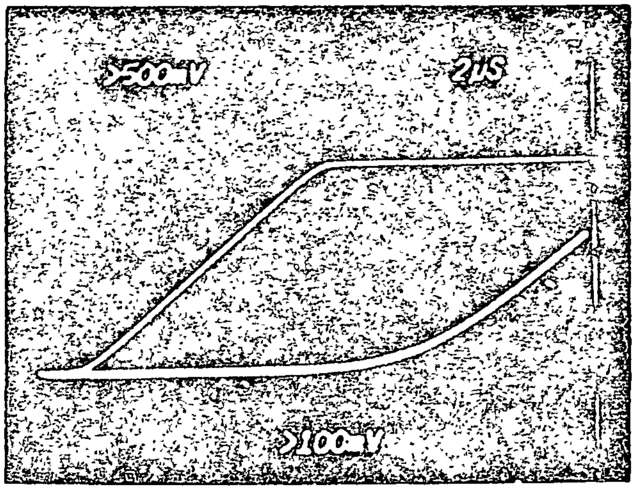
DELAY TIME
12.8 μSec

N.C. DAVISON

DATE: FEB 11, 1982

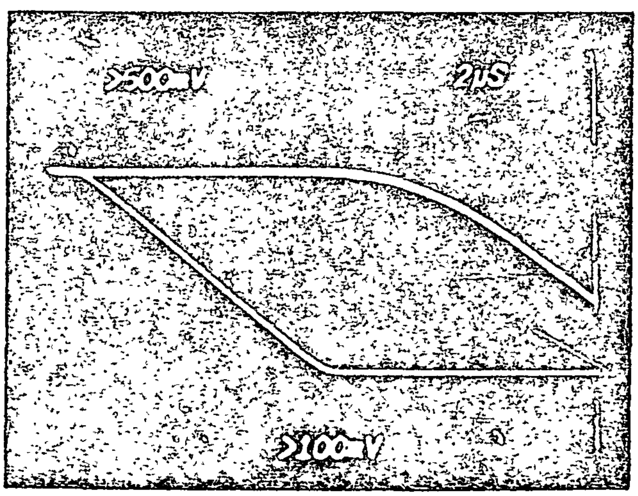
VERIFY
2/18/82

ORIGINAL PAGE IS
OF POOR QUALITY



BAND 7
CHANNEL 16

DELAY TIME
13.0 μSec



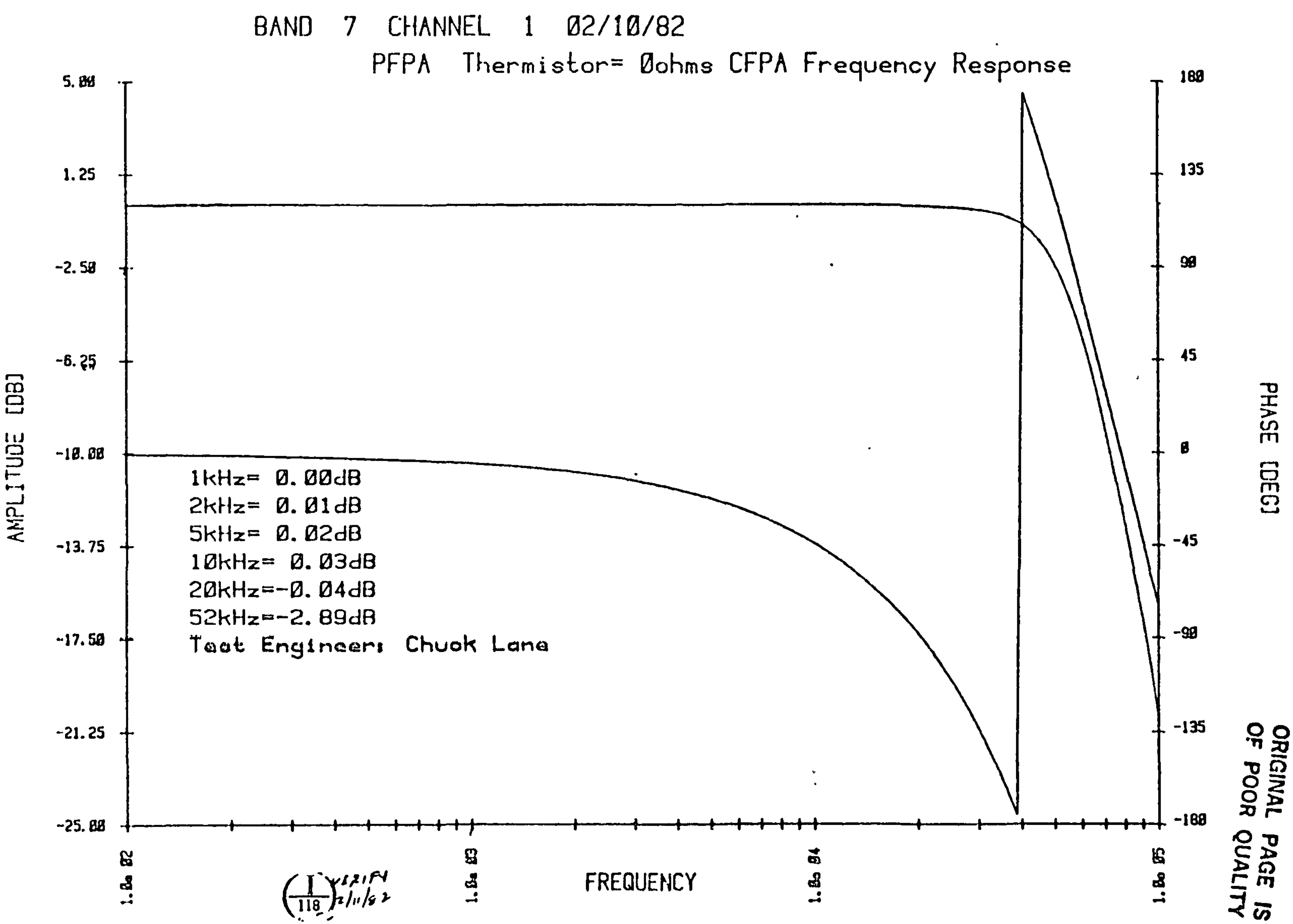
BAND 7
CHANNEL 16

DELAY TIME
13.4 μSec

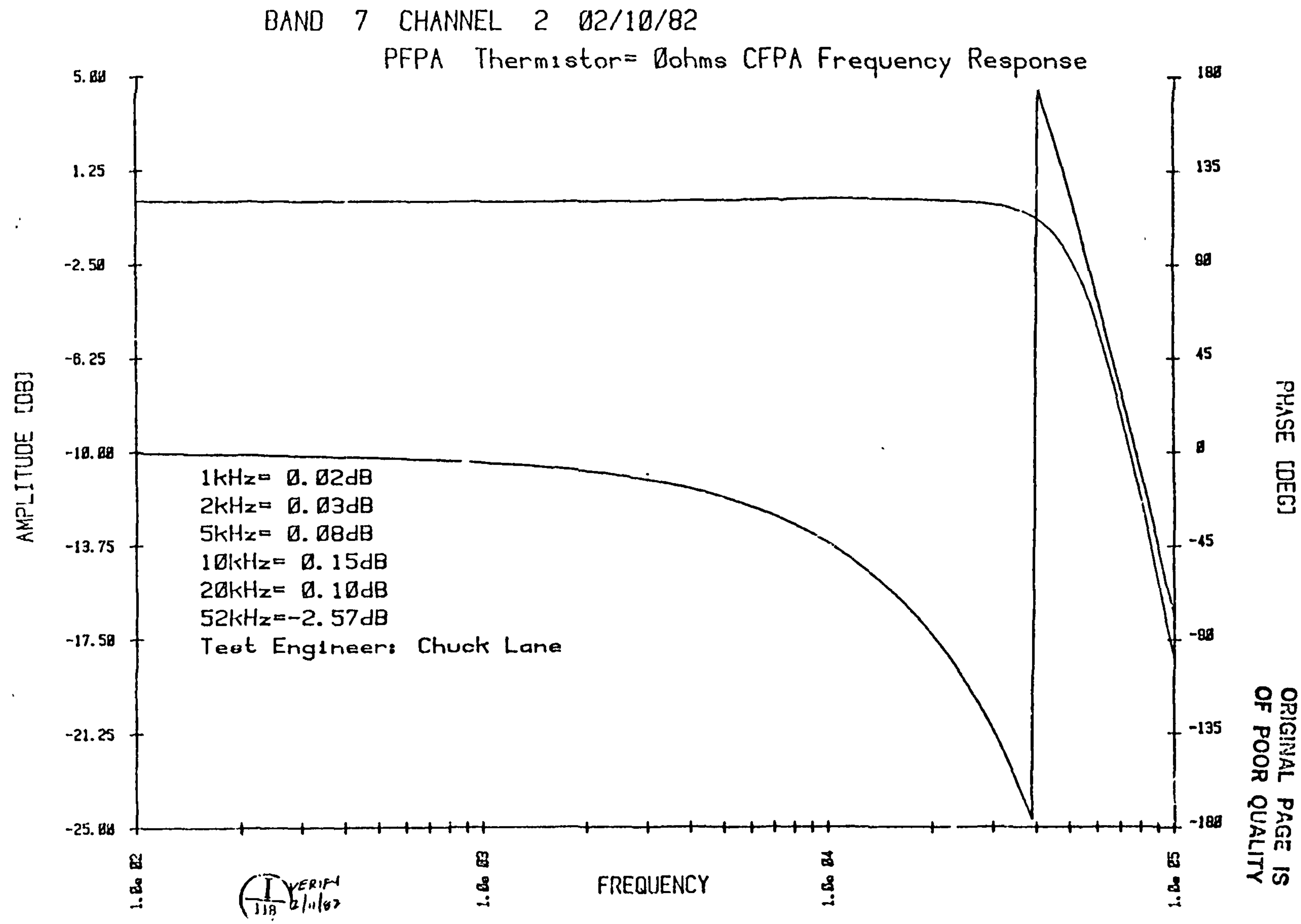
N.C. DAVISON

DATE: FEB 11, 1982

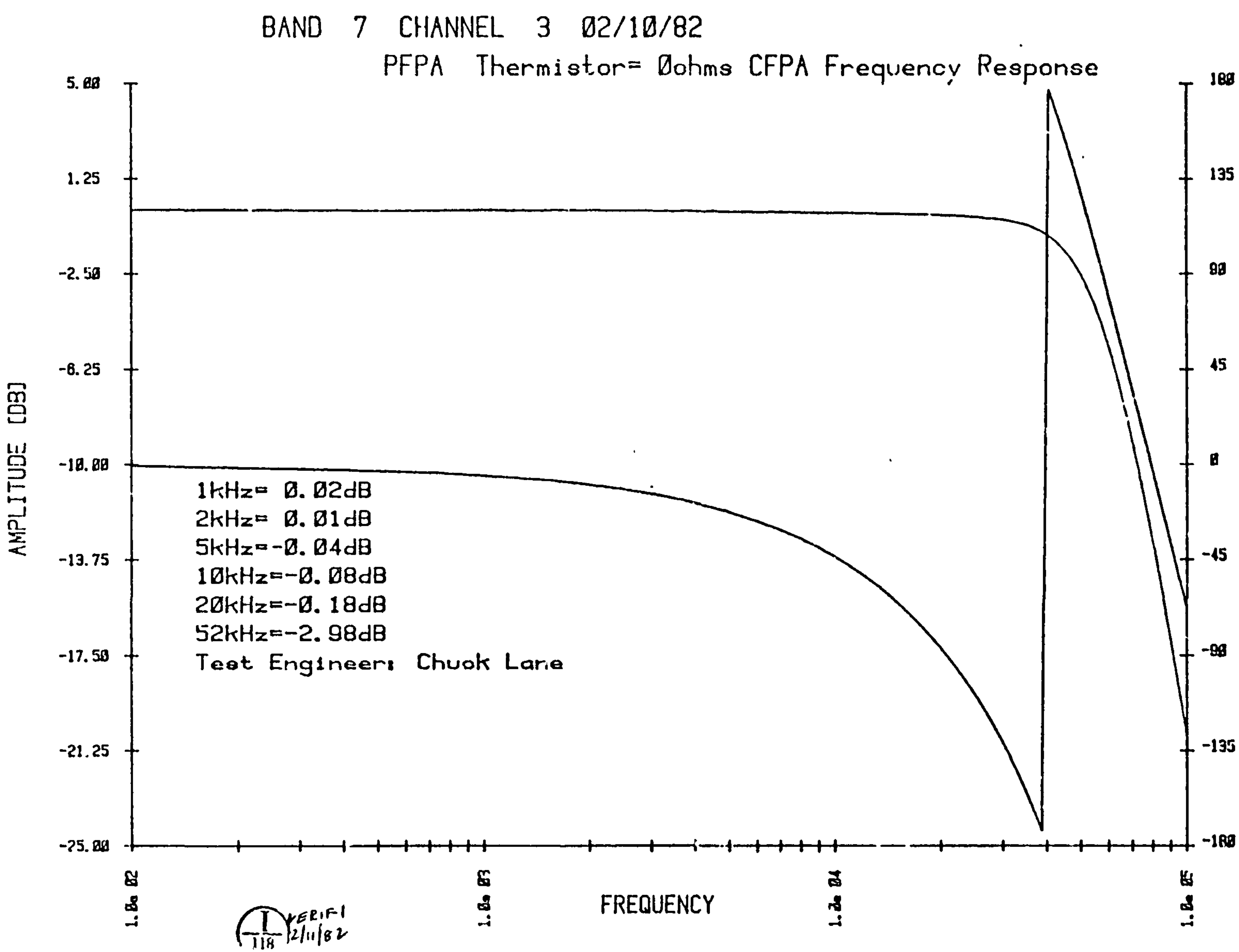
VERIFY 2/18/82



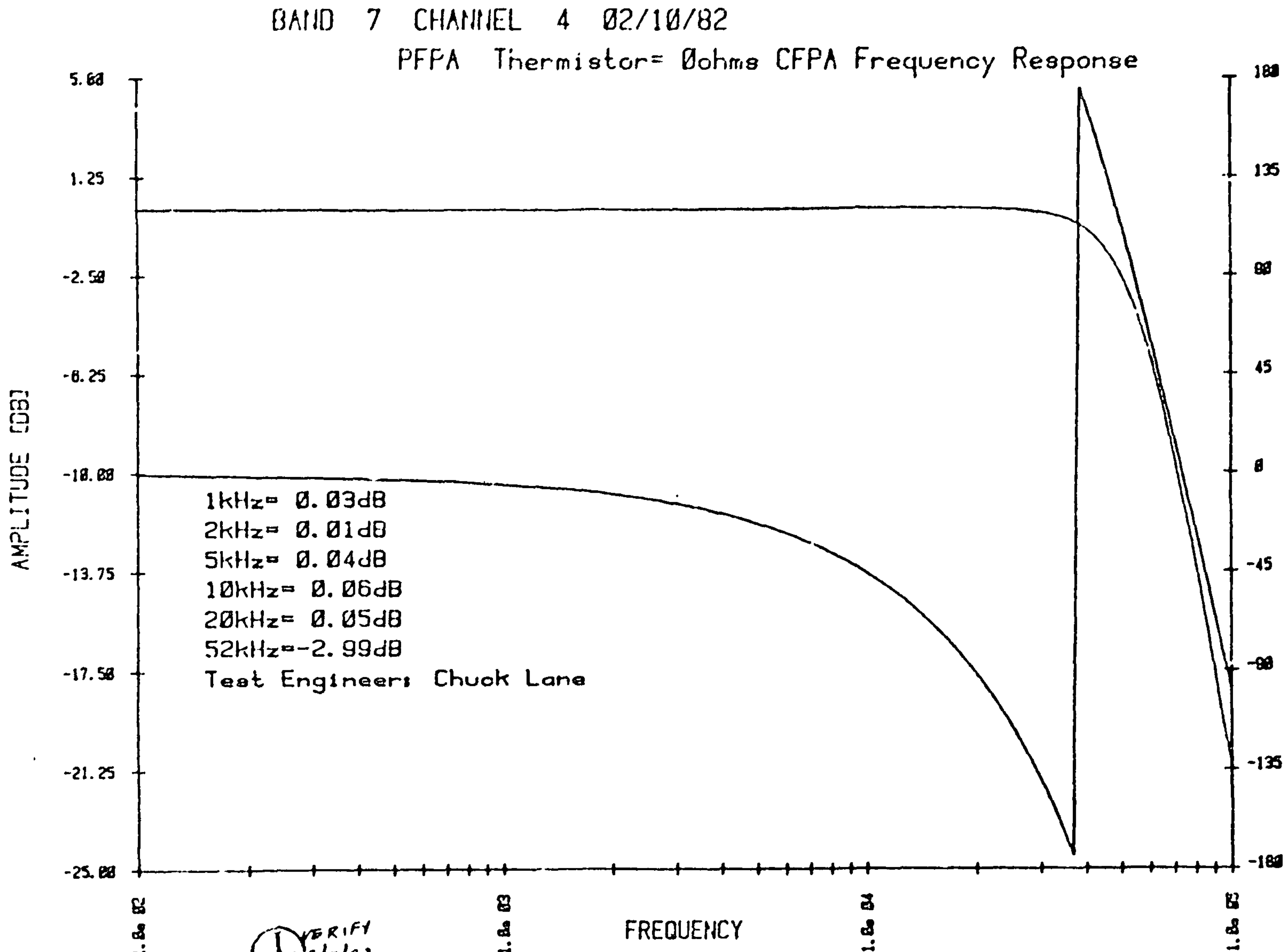
HEWLETT PACKARD
BAND 7 CHANNEL 1 02/10/82
PFPA Thermistor= 0ohms CFPA Frequency Response
AMPLITUDE [DB]
5.00
1.25
-2.50
-6.25
-10.00
-13.75
-17.50
-21.25
-25.00
PHASE [DEG]
180
135
90
45
0
-45
-90
-135
-180
1kHz= 0.00dB
2kHz= 0.01dB
5kHz= 0.02dB
10kHz= 0.03dB
20kHz=-0.04dB
52kHz=-2.89dB
Test Engineer: Chuck Lane
1.0e 02
1.0e 03
1.0e 04
1.0e 05
FREQUENCY
ORIGINAL PAGE IS
OF POOR QUALITY



ORIGINAL PAGE IS
OF POOR QUALITY



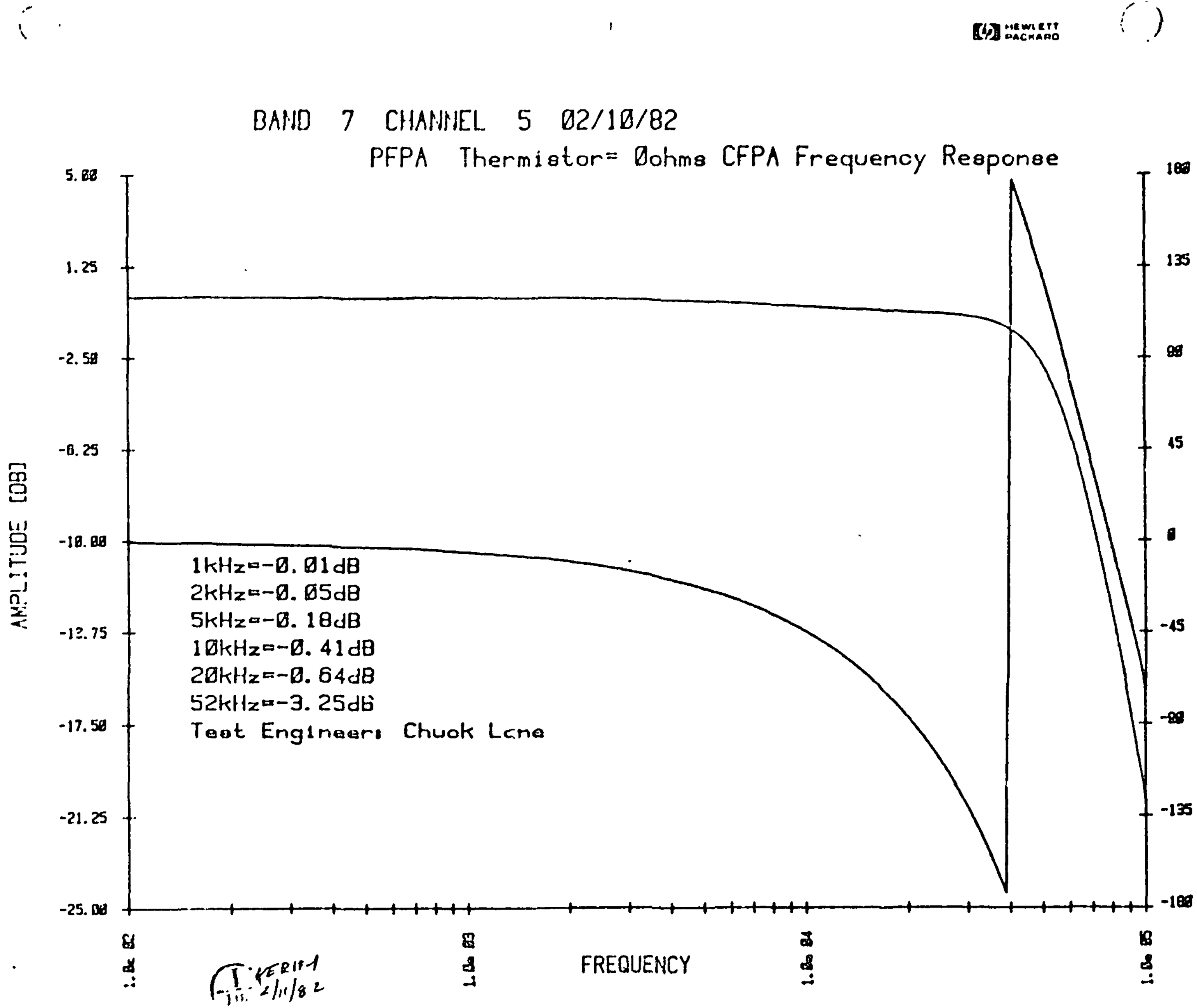
ORIGINAL PAGE IS OF POOR QUALITY



ORIGINAL PAGE IS OF POOR QUALITY

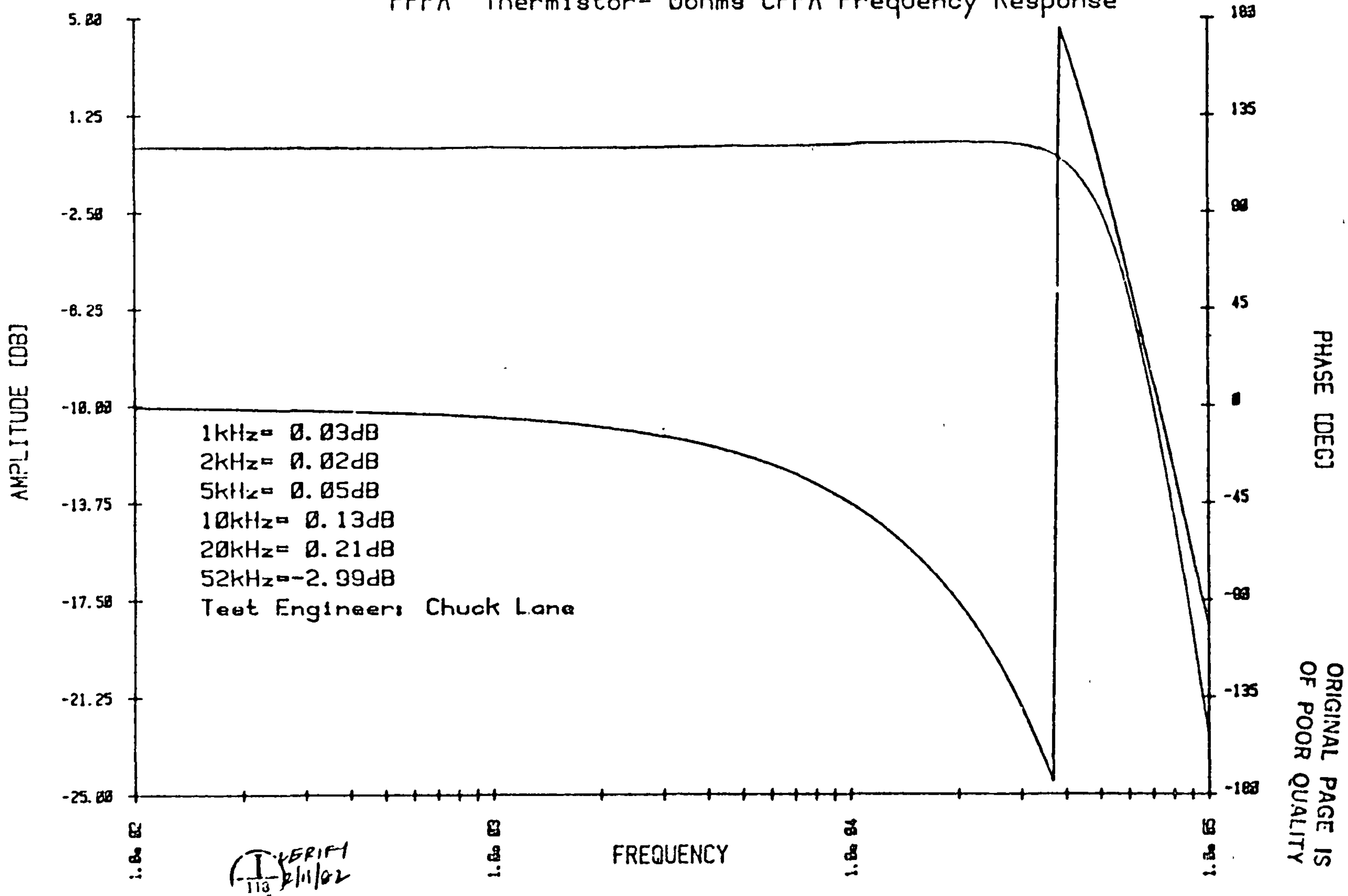
VERIFY 2/11/82

ORIGINAL PAGE IS
OF POOR QUALITY

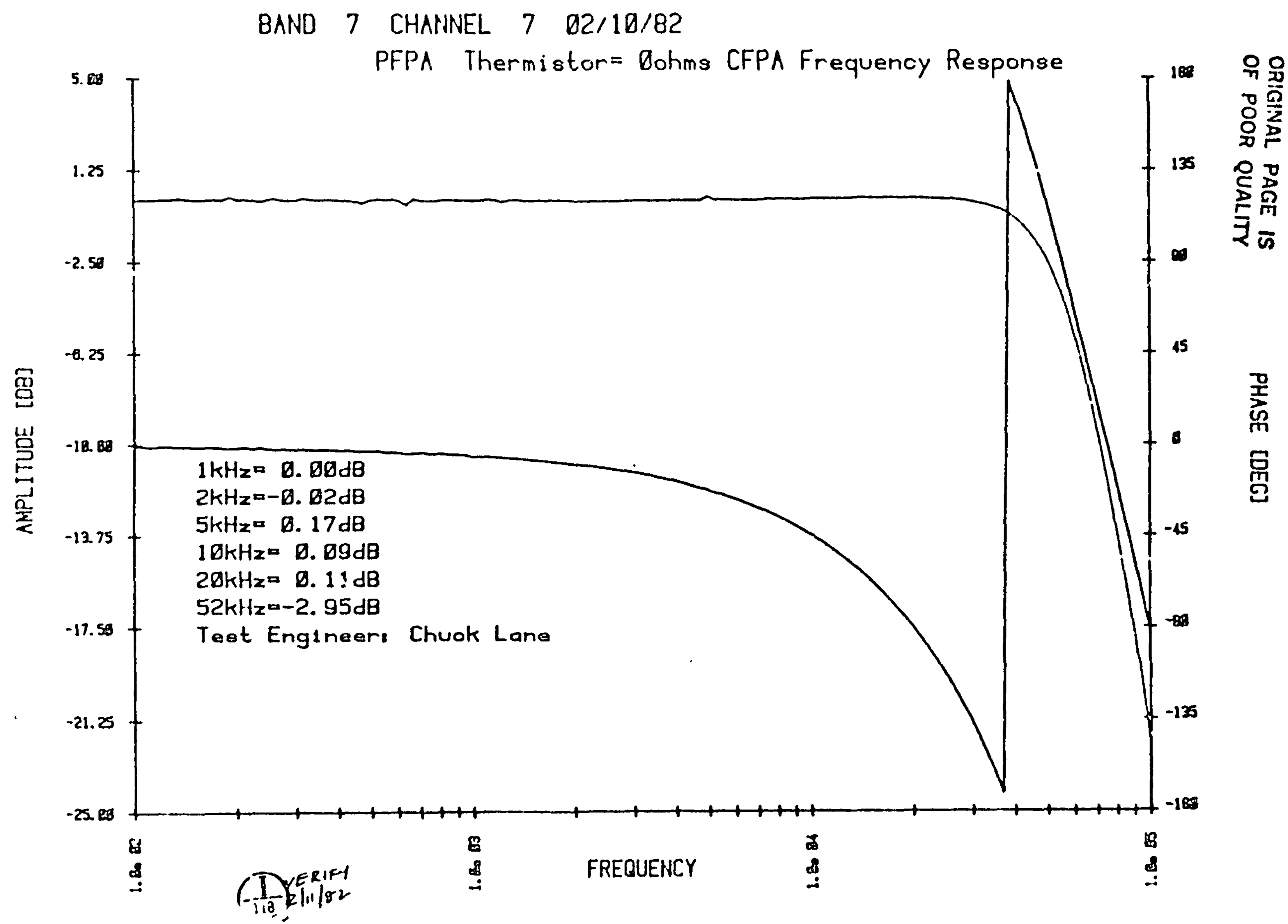


BAND 7 CHANNEL 6 02/10/82

PFPA Thermistor= 0ohms CFPA Frequency Response



ORIGINAL PAGE IS OF POOR QUALITY

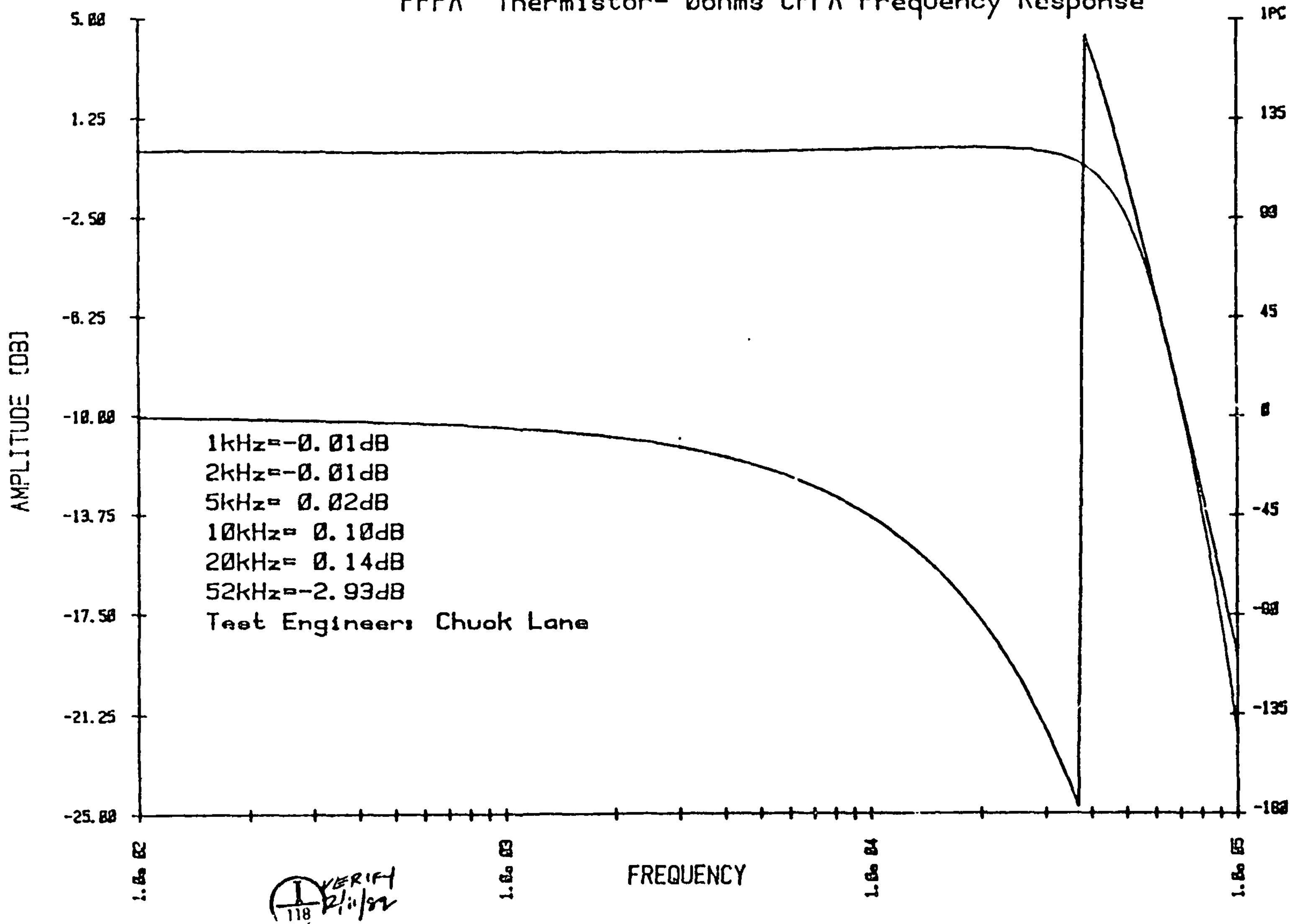


BAND 7 CHANNEL 7 02/10/82
PFPA Thermistor= Øohms CFPA Frequency Response
ORIGINAL PAGE IS OF POOR QUALITY
AMPLITUDE [DB]
PHASE [DEG]
FREQUENCY
1kHz= 0.00dB
2kHz=-0.02dB
5kHz= 0.17dB
10kHz= 0.09dB
20kHz= 0.11dB
52kHz=-2.95dB
Test Engineer: Chuck Lane
VERIFY 2/11/82

HEWLETT PACKARD

BAND 7S CHANNEL 8 02/10/82

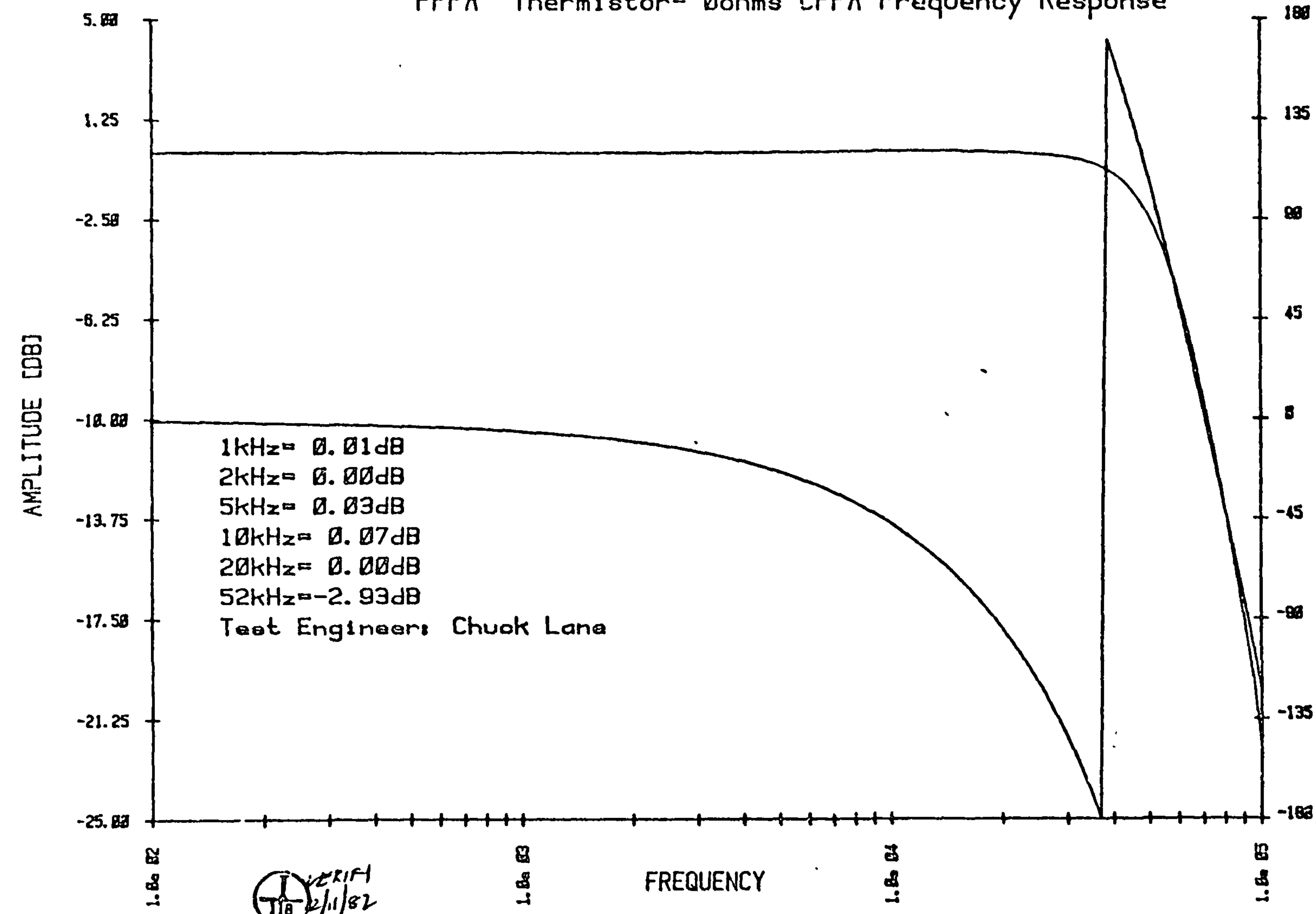
PFPA Thermistor= Øohms CFPA Frequency Response



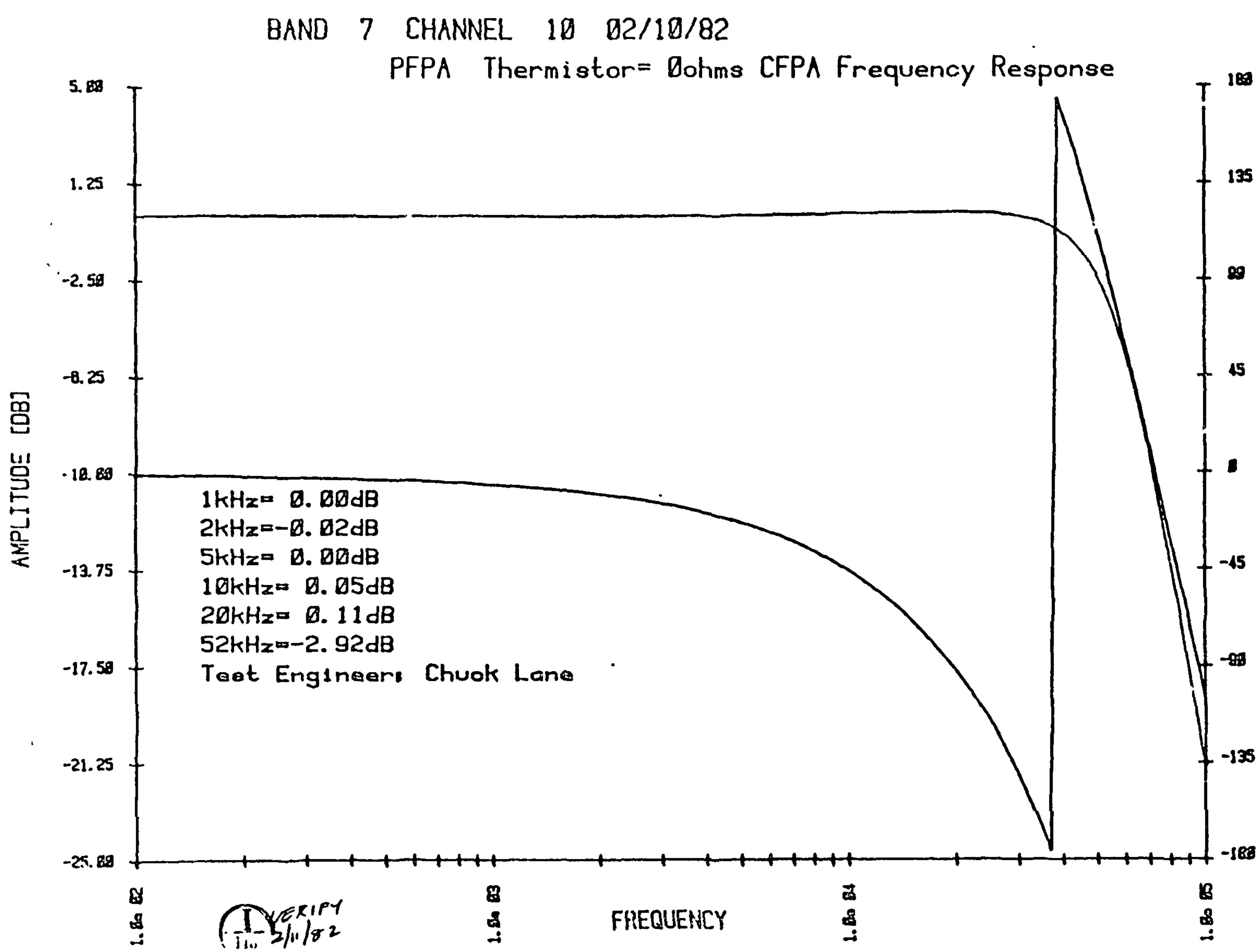
ORIGINAL PAGE IS
OF POOR QUALITY

BAND 7 CHANNEL 9 02/10/82

PFPA Thermistor= 0ohms CFPA Frequency Response



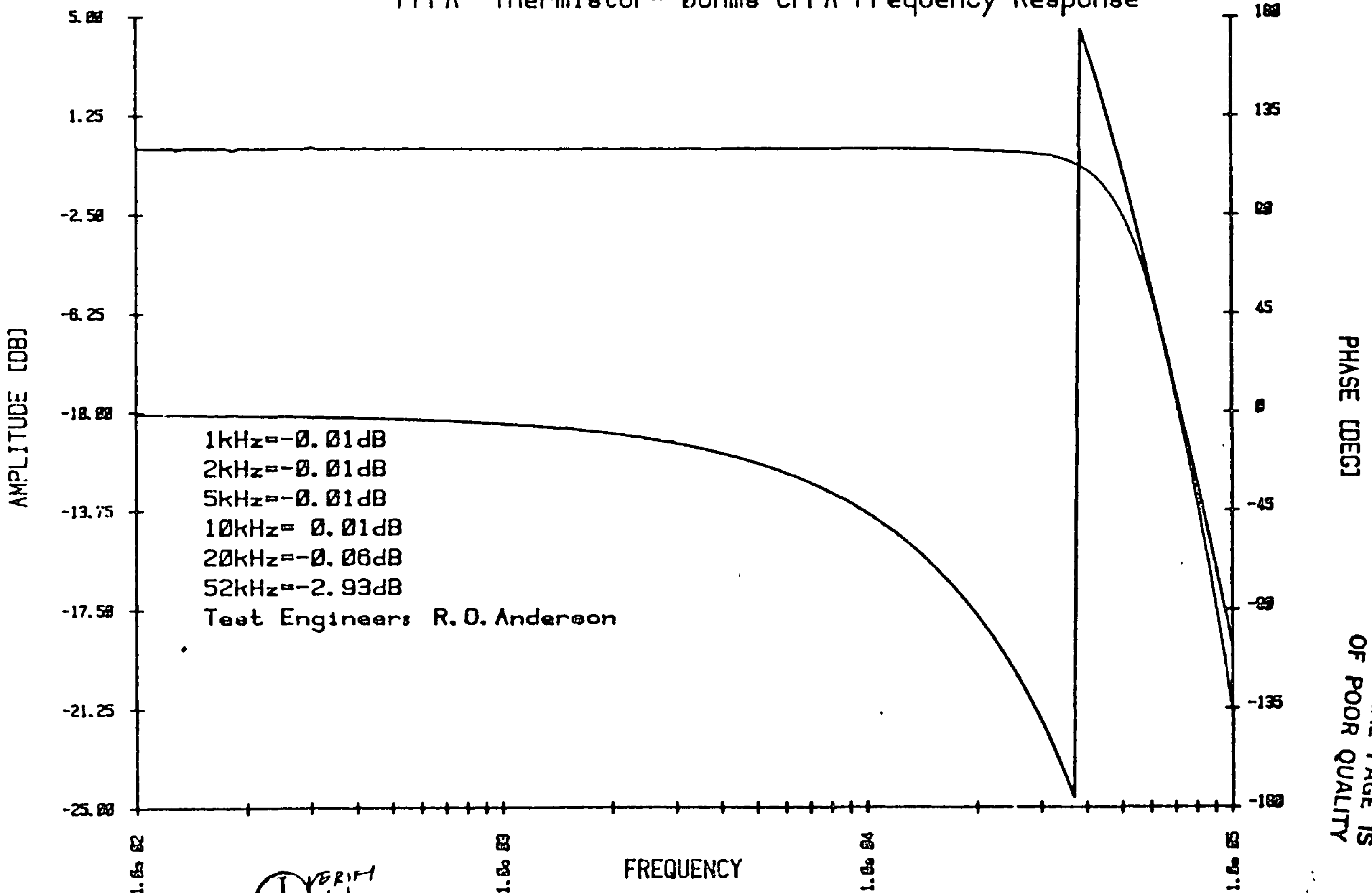
ORIGINAL PAGE IS
OF POOR QUALITY



ORIGINAL PAGE IS
OF POOR QUALITY

BAND 7 CHANNEL 11 2/10/82

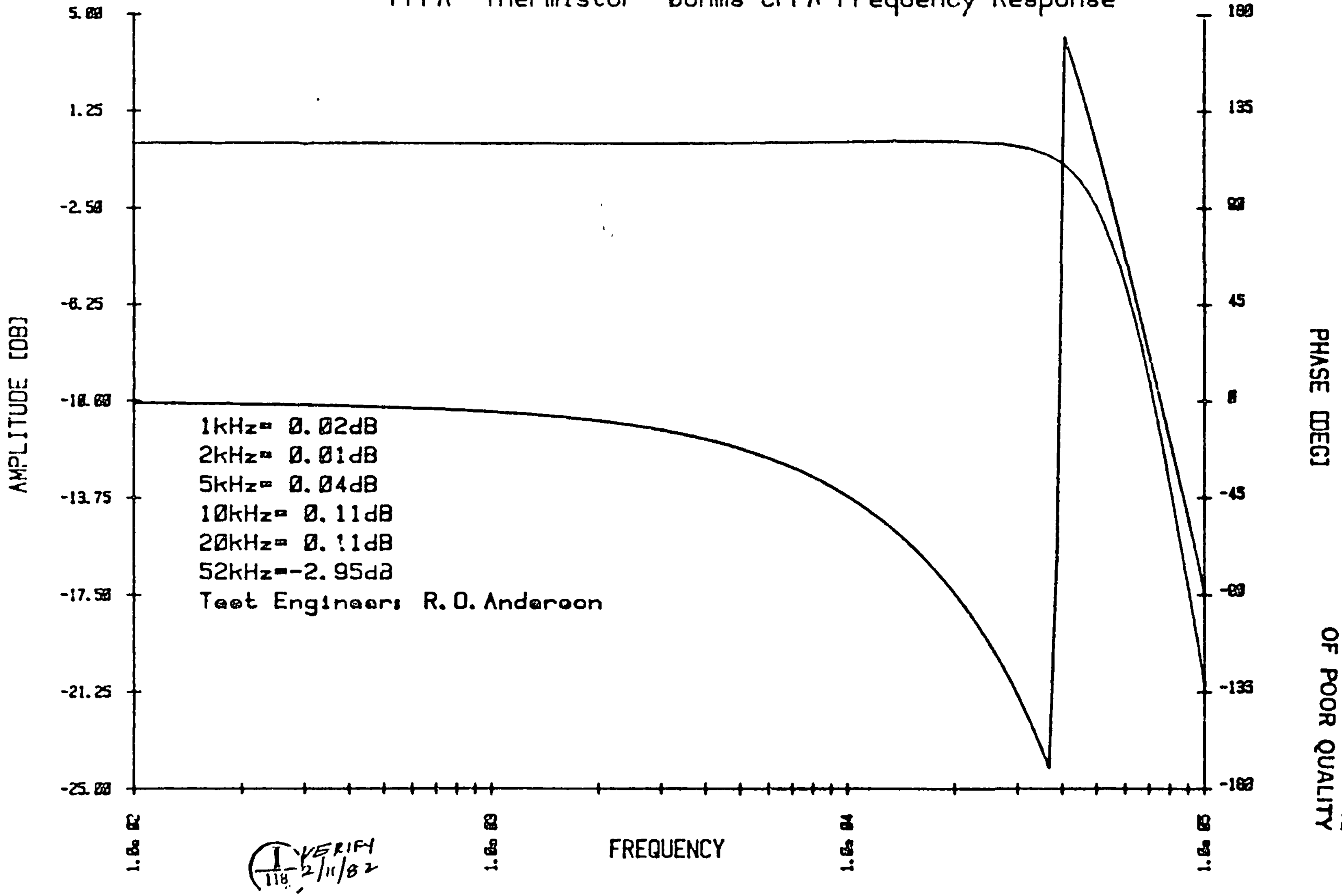
PFPA Thermistor= Øohms CFPA Frequency Response



VERIFY 2/11/82

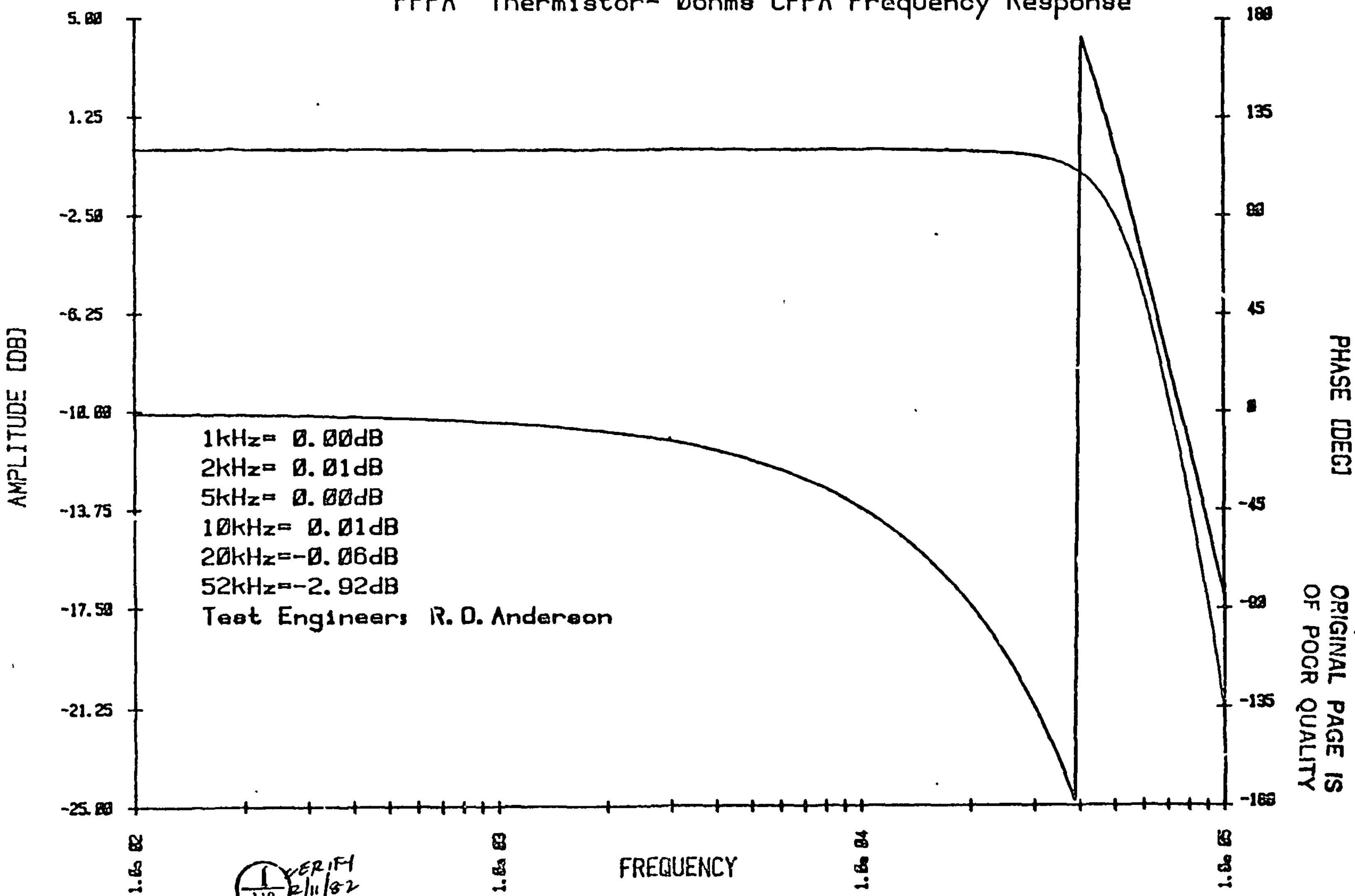
BAND 7 CHANNEL 12 2/10/82

PFPA Thermistor= Øohms CFPA Frequency Response



BAND 7 CHANNEL 13 2/10/82

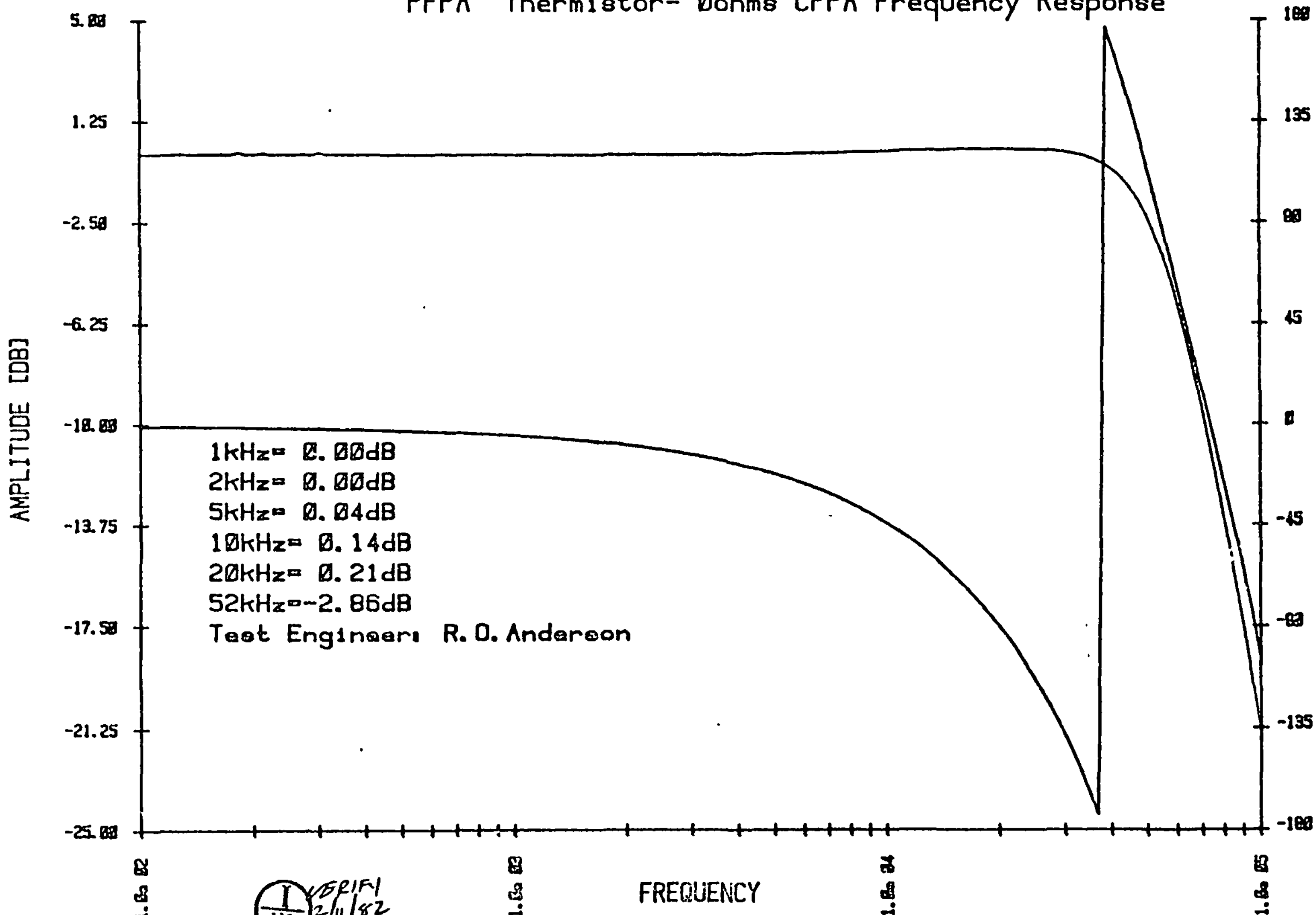
PFPA Thermistor= Øohms CFPA Frequency Response



VERIFI 2/11/82 118

BAND 7 CHANNEL 14 2/10/82

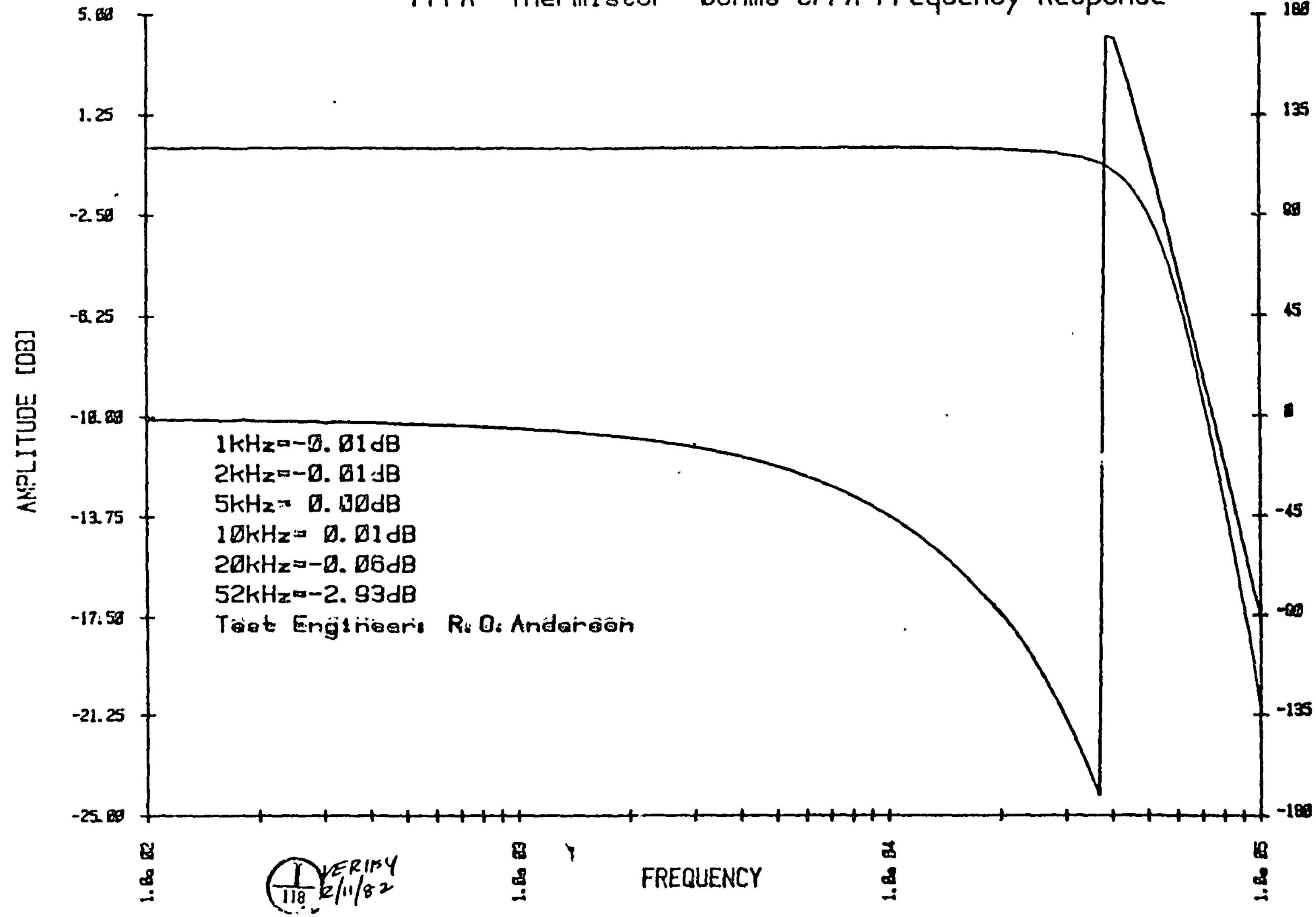
PFPA Thermistor= 0ohms CFPA Frequency Response



VERIFI 2/11/82

BAND 7 CHANNEL 15 2/10/82

PFPA Thermistor= Øohms CFPA Frequency Response

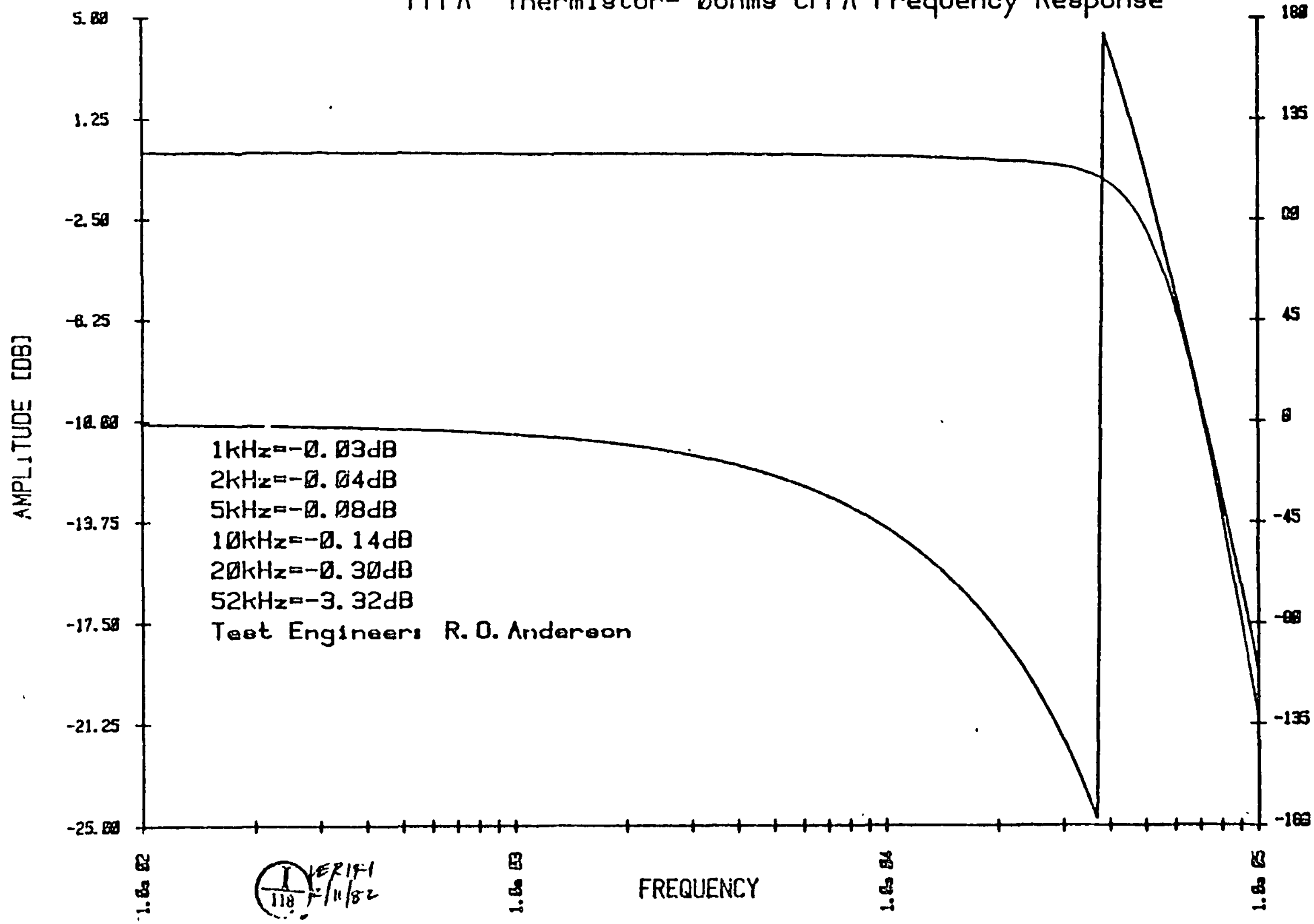


ORIGINAL PAGE IS OF POOR QUALITY

HEWLETT PACKARD

BAND 7 CHANNEL 16 2/10/82

PFPA Thermistor= Øohms CFPA Frequency Response



BAND 7 GAIN LEVELING
PER 16192 PARAGRAPH 4.13 → TEST AHR #50973 OPERATION #2300

ORIGINAL PAGE IS
OF POOR QUALITY

BOOSTED FREQUENCY AND TRANSIENT RESPONSE BAND 7

TEST SHEET 10
PAGE 4 of 4

CFPA SERNO 201 DATE FEB. 16, 1982

BAND 7 PREAMP NO 201 BAND 7 POSTAMP NO. 201

T1 READING .976 VOLTS = 91.0 °K TEST ENGINEER C. R. Lane

T2 READING .976 VOLTS = 91.0 °K

CURRENTS: +19VDC = .075 AMPS -19VDC = .075 AMPS
150mA MAX 150 mA MAX

CH	POST GAIN SET NO	POST GAIN SET OHMS (KΩ)	POST GAIN SET 908600-	PRE GAIN SET NO.	PRE GAIN SET (KΩ)	PRE GAIN SET 908600-	POST GAIN CAPACITOR NO.	POST GAIN CAPACITOR pF	POST GAIN CAPACITOR 908505-	BOOST CAPACITOR NO.	BOOST CAPACITOR pF	BOOST CAPACITOR 908504-
1	R33	26.7	-263	R81	1.15	-132	C33	0		C57	0	
2	R41	26.7	-263	R89	1.15	-132	C41			C65		
3	R34	23.7	-258	R82	1.15	-132	C34			C58		
4	R42	32.4	-271	R90	1.15	-132	C42			C66		
5	R35	30.9	-269	R83	1.15	-132	C35			C59		
6	R43	35.7	-275	R91	1.15	-132	C43			C67		
7	R36	30.9	-269	R84	1.15	-132	C36			C60		
8	R44	23.7	-258	R92	1.15	-132	C44			C68		
9	R37	41.2	-281	R85	1.15	-132	C37			C61		
10	R45	35.7	-275	R93	1.15	-132	C45			C69		
11	R38	35.7	-275	R86	1.15	-132	C38			C62		
12	R46	25.5	-261	R94	1.15	-132	C46			C70		
13	R39	25.5	-261	R87	1.15	-132	C39			C63		
14	R47	23.7	-258	R95	1.15	-132	C47			C71		
15	R40	26.7	-263	R88	1.15	-132	C40			C64		
16	R48	30.9	-269	R96	1.15	-132	C48	0		C72	0	

DESIGN ENGINEER [signature] III

EQUIPMENT USED MODEL SERNO CAL DUE DATE

1)
2)
3)
4)
5)
6)
7)
8)
9)
10)

1/118 VERIFY RESISTORS INSTALLED ON STANDOFFS AS RECORDED ABOVE, AND THAT THEY ARE FROM THE APPROPRIATE SELECT LIST.
2/17/82

SIZE	CODE IDENT NO	NUMBER
A	11323	

SCALE REV SHEET

BIAS ADJUST BAND 7 FLIGHT ORIGINAL PAGE IS OF POOR QUALITY TEST SHEET 7B

DATE: 18 DEC 81

FPA SERNO 201 WITH PREAMP ASSY 51843

PREAMP SERNO 201

T1 READING .931 VOLTS= °K TEST ENGINEER

T2 READING .474 VOLTS= °K R. O. Anderson

Recheck after selects installed.

CHANNEL	(±10mV) FEEDBACK mV	SIGNAL LINE OHMS (1K MAX)	R NUMBER	SELECT PART 908600-	C NUMBER	SELECT PART 908504-	COMMENTS
1	1.0		R14		C31		
2	2.2		R13		C30		
3	1.2		R15		C32		
4	2.1		R12		C29		
5	1.3		R16		C33		
6	0.6		R11		C28		
7	1.0		R17		C34		
8	1.7		R10		C27		
9	+1.2		R2		C19		
10	+0.5		R9		C26		
11	+1.6		R3		C20		
12	+0.6		R8		C25		
13	1.2		R4		C21		
14	+1.2		R7		C24		
15	0.8		R5		C22		
16	-0.5		R6		C23		

DESIGN ENGINEER R.O. Anderson

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
1)	8020A	SGRC 801383	3 MAR 82
2)	6255A	NASA 457601	NCR
3)	7603	SGRC 803489	27 JAN 82
4)	7A22	SGRC 803435	22 JAN 82
5)	7655A	SGRC 803497	27 JAN 82

VERIFY FEEDBACK IN SPEC. NOTE: DETECTOR NOT CONNECTED 12/18/81

51483 PWR OF 205

SIZE	CODE IDENT NO.	NUMBER
A	11323	16192
SCALE	REV B	SHEET 34

BIAS ADJUST BAND 7 FLIGHT

ORIGINAL PAGE IS OF POOR QUALITY

TEST SHEET 7B

DATE: 14 DEC 81

CFPA SERNO 201 WITH PREAMP ASSY ~~5~~ 51843

AMP SERNO 201

T1 READING .979 VOLTS= °K

T2 READING .978 VOLTS= °K

TEST ENGINEER Robert O. Anderson

CHANNEL	(±10 mV) FEEDBACK mV	SIGNAL LINE OHMS (1K MAX)	R NUMBER	SELECT PART 906600-	C NUMBER	SELECT PART 908504-	COMMENTS
1	0.9	549	R14	101	C31	17	
* 2.9 2	0.6	374	R13	85	C30	21	
3	1.1	576	R15	103	C32	13	
4	1.6	576	R12	103	C29	21	
5	1.1	422	R16	90	C33	13	
6	1.6	453	R11	93	C28	18	
7	0.3	499	R17	97	C34	16	
8	-0.4	576	R10	103	C27	22	
9	1.4	634	R2	107	C19	25	
* 2.8 10	0.2	576	R9	103	C26	22	
11	1.6	499	R3	97	C20	23	
* 2.7 12	0.7	523	R8	99	C25	19	
13	1.3	523	R4	99	C21	17	
14	~~0~~.2 (1.2)	453	R7	93	C24	15	
* 2.7 15	0.6	576	R5	103	C22	21	
16	-0.4	324	R6	79	C23	24	

DESIGN ENGINEER Robert O Anderson WMK

EQUIPMENT USED	MODEL	SERNO	CAL DUE DATE
	1) TP 325	SERC# 802772	NCR
	2) 7603	SERC# 803448	27 JAN 82
	3) 7A22	SERC# 803435	22 JAN 82
	4) 7D53A	SERC# 803496	27 JAN 82
	5) 8020A	SERC# 801383	23 AUG 82

I 118 VERIFI NOTE: DETECTOR NOT CONNECTED 12/14/81

SIZE	CODE IDENT NO.	NUMBER
A	11323	16192
SCALE	REV B	SHEET 34

ORIGINAL PAGE IS OF POOR QUALITY

FLIGHT

TEST SHEET I

D.C. OFFSET TEST

CFPA SERNO 201 BAND 7 DATE 13 DEC 81

TI READING .972 VOLTS = _____ °K TEST ENGINEER

T2 READING .972 VOLTS = _____ °K Robert O. Anderson

DRAIN CURRENT 1590 μa (100μa to 1000μa) DRAIN VOLTAGE 3.9 VOLTS DC (2.5 to 4.5 VDC)

CHANNEL	VOLTS .02 TO 1.8VDC SIGNAL	REF	SIGNAL-REF (mV) ± 10mV	COMMENTS--
1	.205	.199	6	
2	.150	.156	-6	
3	.167	.166	1	
4	.179	.179	0	
5	.144	.148	-4	
6	.138	.142	-4	
7	.128	.128	0	
8	.796	.791	5	
9	.169	.164	5	
10	.244	.243	1	
11	.795	.795	0	
12	.898	.895	3	
13	.993	.991	2	
14	1.279	1.279	0	
15	.807	.803	4	
16	.978	.985	-7	

DESIGN ENGINEER R O Anderson

METERS USED	MODEL	SERNO	CAL DUE DATE
VERIFY NOTE: DETECTOR NOT CONNECTED 12/13/81	1) HP 3438A	56CC803267	29 JAN 82
	2) HP 3438A	56CC803268	29 JAN 82
	3) TP325	56CC802772	NCK

SIZE	CODE IDENT NO	NUMBER
A	11323	16192

SCALE | REV | SHEET

ORIGINAL PAGE IS
OF POOR QUALITY

FLIGHT
TROUBLESHOOTING
REF. FRHS 8340

TEST SHEET 3

CFPA SERNO 201 BAND 7 DATE 23 Oct 81

T1 READING .978 VOLTS= ____ °K

T2 READING .978 VOLTS= ____ °K

TEST ENGINEER
R.O. Anderson

20mV RMS SINE WAVE IN.

CHANNEL	FREQUENCY (Hz) OUTPUT IN mV						FREQUENCY (Hz)		COMMENTS
	3.9mV MIN						70-110	2.9K to 5.9K	
							LOWER 3db POINT	UPPER 3db POINT	
	10	100	1K	10K	50K	100K			
1	10.4	9.0					/		
2	9.7	7.7							
3	10.1	7.8							
4	10.6	8.0							
5	10.5	9.0	SEE NOTE 2						
6	10.2	7.8	IN REGARDS						
7	10.2	7.9	TO THESE						
8	—	—	COLUMNS						
9	11.0	8.3							
10	10.4	7.6							
11	11.1	8.3							
12	10.6	7.7							
13	10.5	8.0							
14	10.7	7.8							
15	10.6	8.1							
16	—	—							

DESIGN ENGINEER R.O. Anderson

EQUIPMENT USED

	MODEL	SERNO	CAL DUE DATE
1)	3570A	SBRC 803413	17 Feb 82
2)	3330B	SBRC 803412	17 Feb 82
3)	340A	G-456998	78 JAN 82
4)	TP325	SBRC 802772	NCR

NOTE: ① NO OUTPUT READINGS ON CH 8 and CH 16. POSSIBLE BAD DETECTORS

TITLE ② NOT REQUIRED PER PROJECT ENGINEER (DAVE CANDALL).

SIZE	CODE IDENT NO	NUMBER
A	11323	16192

SCALE | REV D | SHEET 31

ORIGINAL PAGE IS OF POOR QUALITY

FLIGHT TROUBLESHOOTING REF FR# S8340

TEST SHEET I

D.C. OFFSET TEST

CFPA SERNO 201 BAND 7 DATE 23 OCT 81

T1 READING .978 VOLTS = ______ °K TEST ENGINEER

T2 READING .978 VOLTS = ______ °K R. O. Anderson

DRAIN CURRENT 158.1 μa (100μa to 1000μa) DRAIN VOLTAGE 3.9 VOLTS DC (2.5 to 4.5 VDC)

CHANNEL	VOLTS .02 TO 1.8VDC SIGNAL	VOLTS .02 TO 1.8VDC REF	SIGNAL-REF (mV) ± 10mV	COMMENTS-- DETECTOR RESISTANCE
1	.202	.195	7	2.4×10^9
2	.147	.151	-4	2.4×10^9
3	.164	.161	3	2.4×10^9
4	.177	.174	3	2.4×10^9
5	.141	.143	-2	2.4×10^9
6	.135	.137	-2	2.4×10^9
7	.126	.123	3	2.4×10^9
8	.791	.786	5	2.2×10^9
9	.166	.160	6	2.4×10^9
10	.242	.239	3	2.5×10^9
11	.792	.790	2	2.4×10^9
12	.895	.890	5	2.5×10^9
13	.991	.937	4	2.5×10^9
14	1.276	1.274	2	2.4×10^9
15	.804	.799	5	2.4×10^9
16	.973	.980	-7	2.0×10^9

DESIGN ENGINEER R.O. Anderson

METERS USED	MODEL	SERNO	CAL DUE DATE
1)	3438A	SBRC 803268	29 JAN 82
2)	3438A	SBRC 803267	29 JAN 82
3)	6035	SBRC 03776	14 JAN 82
	TP325	SBRC 802772	NCR

NOTE: DETECTOR RESIS OF CH 8 AND CH16 ARE LOW. POSSIBLE SHORTED DETECTOR.

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16192
SCALE	REV D	SHEET 28	

END

DATE

FILMED

AUG 8 1983